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NATIONAL DAM INSPECTION PROGRAM. MINSI DAM (NDS ID PA 00788 DER--ETC(U)
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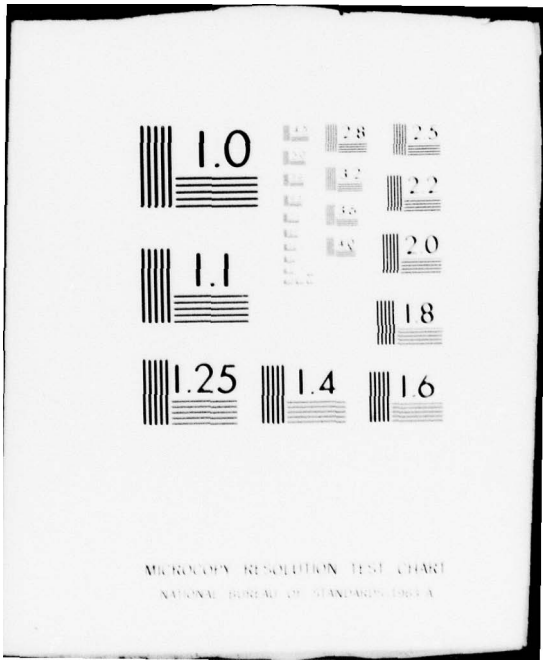
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LEVEL II

DELAWARE RIVER BASIN
EAST BRANCH MARTIN'S CREEK, NORTHAMPTON COUNTY
PENNSYLVANIA
NDS ID NO. 00705
DER ID 48-106

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MINSI DAM

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

JUNE 1979

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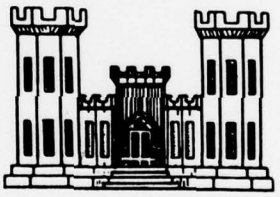
DELAWARE RIVER BASIN

MINSI DAM, NORTHAMPTON COUNTY PENNSYLVANIA

NDS I.D. NO. PA 00788
DER I.D. NO. 48-139

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



Prepared by:

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Plymouth Meeting, Pennsylvania 19462

Submitted to:

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I investigation is to expeditiously identify those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify the need for more detailed studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected, and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam:	Minsi Lake Dam
County Located:	Northampton County
State Located:	Pennsylvania
Stream:	East Branch Martins Creek
Coordinates:	Latitude 40° 54.7'
	Longitude 75° 10.3'
Date of Inspection:	19 April 1979

Minsi Lake Dam is owned by the Pennsylvania Fish Commission. Preliminary design drawings were prepared by Jordan, McNee, Parnum & Yule of Camp Hill, Pennsylvania, in 1966, and construction began in July 1969. The facility is considered to be in good condition and well maintained. The dam is classified as a "High" hazard potential structure consistent with its potential, in the event of failure, to cause extensive property damage and possible loss of life downstream. The dam is also classified as an "Intermediate" size dam by virtue of its 1,793 acre-foot total storage capacity.

Design documentation, specifications and the visual inspection provided sufficient information to evaluate the embankment and appurtenant structures in accordance with provisions of the Phase I Inspection program.

Hydrologic and hydraulic calculations presented in Appendix C indicate the dam will pass approximately 70 percent of the Probable Maximum Flood (PMF) without overtopping. Therefore, the spillway system is considered to be "Inadequate" but not "Seriously Inadequate" as it passes more than 50 percent of the PMF.

Visual inspection of the dam and reservoir detected no significant problems other than some wet areas downstream, which were assessed to be associated with adverse drainage downstream. Also, slight deterioration of the upstream embankment facing was noted as a result of wave action and ice forces.

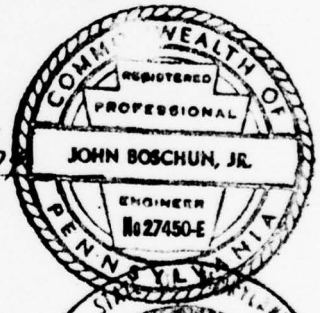
The following recommendations are suggested to insure that the structure is maintained in the best possible condition. All engineering evaluations pertaining to corrective work or the need for corrective work should be reviewed

by a registered professional engineer experienced in the design of dams.

1. The marshy area at the toe of the structure should be regraded and drained away from the dam. Subsequently, seepage should be monitored to determine if it flows through the embankment. Should it be determined that seepage flows through the embankment, appropriate remedial measures should be taken to control this flow.

2. Concrete block on the upstream slopes should continue to be monitored, especially during the spring of each year. Deteriorated block should be removed and replaced with new block.

Operation and maintenance procedures currently in draft form should be issued as soon as possible. The Owner should be sure to develop an operation and maintenance checklist which would be used during the regular inspections to insure that all items of the structure are maintained in the best possible condition.



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APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

17 July 79
Date

OVERVIEW
MINSI DAM, NORTHAMPTON COUNTY, PENNSYLVANIA

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
MINSI LAKE DAM
NATIONAL ID #PA 00788
DER #48-139

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Minsi Lake Dam is a 26.5 foot high zoned earth embankment across East Branch Martins Creek. The dam has a maximum length of 3,000 feet and the 117-acre reservoir has a normal storage capacity of 960 acre-feet.

The zoned earth embankment contains an impervious core over a 12 foot wide cutoff trench under the centerline of the dam. ~~As shown on Plate 4,~~ the upstream side consists of Class A fill and the slope is 3H:1V. The upstream slope is also protected with hand-placed concrete blocks over a nine-inch crushed stone filter course from elevation 694 to the crest, 703.5. The blocks are 8 by 12 by 16 inches nominal and placed with a 12-inch face exposed. The downstream slope contains a Class B fill beneath a pervious shell. The shell is connected to the toe drain by a filter. The toe drain porous drain pipe discharges into the fish catch basin. The downstream slope is 2.5H:1V and is protected with grass. ~~Typical~~ embankment sections are shown ~~on Plate 4~~.

The dam was designed by the Pennsylvania Fish Commission and contains a standard Fish Commission intake tower located about 15 feet upstream of the centerline at Station 17 + 65. The tower contains an interior overflow weir formed by stoplogs. Water enters the tower through a 3 foot by 3 foot concrete conduit extending from the upstream toe through the embankment to the intake tower base. A 3 foot by 3

foot concrete discharge conduit extends from the tower to the downstream toe. The entrance invert is at elevation 677.5 and the exit invert is at elevation 677. There are four anti-seep collars, two upstream and two downstream of the tower. The top of the tower is at elevation 706.67, and normal pool elevation corresponds to approximately 698, the crest of the emergency spillway weir. Normal pool elevation is controlled by both the stoplogs within the tower and the emergency spillway. The reservoir drain is through the tower, invert elevation 677.3, and is controlled by a 2 foot by 2 foot sluice gate. The tower also contains a two-inch cast iron minimum flow pipe and valve which are used to maintain minimum flow downstream. Typical section, plan and profile views are enclosed as Plates 6 and 7.

The emergency spillway located at the left abutment consists of a concrete trapezoidal weir at elevation 698.0. The 80 foot wide spillway is shown on Plates 3c and 8 with a typical cross-section on Plates 8 and 9.

b. Location. Minsi Lake Dam is on East Branch Martins Creek about 2-3/4 miles north of East Bangor, Pennsylvania. The dam and reservoir are located in Upper Mount Bethel Township, Northampton County, Pennsylvania, and are located on the "Stroudsburg, Pennsylvania" Quadrangle at coordinates N 40° 54.7' W 75° 10.4'. A regional location plan of Minsi Lake Dam and reservoir is enclosed as Plate 1, Appendix E.

c. Size Classification. The dam is classified as an "Intermediate" size dam by virtue of its 1,793 acre-foot total storage capacity.

d. Hazard Classification. A "High" hazard classification is assigned consistent with the potential for extensive property damage and loss of life downstream, particularly along Martins Creek near Rosetta, Pennsylvania, along PA Route 191.

e. Ownership. The dam is owned and maintained by the Pennsylvania Fish Commission. All correspondence should be sent to Mr. E. J. Grindall, Senior Project Engineer, Pennsylvania Fish Commission, Division of Engineering, Robinson Lane, Belfont, Pennsylvania 16823.

f. Purpose of Dam. The reservoir is used as a fishing lake.

g. Design and Construction History. Test borings for this project were performed by Borings, Soils & Testing Company and F. T. Kitlinsky & Associates, both of Harrisburg,

Pennsylvania. The topographic survey and preliminary design drawings were prepared by Jordan, McNee, Parnum & Yule of Camp Hill, Pennsylvania, in 1965 and 1966. In October 1966, the Fish Commission cancelled the project, apparently because construction bids exceeded the allotted funds. In March 1969, the project proceeded with "Project 500" funds. The State prepared final construction drawings and construction began on July 8, 1969.

In an October 13, 1969 inspection report by Mr. Fisher, remarks indicate that boils were observed in the foundation area. This condition was discussed with DER, who recommended extending the filter blanket over the boils and continuing drainage through the toe of the dam. According to Mr. Roy R. Frank, "It is my opinion that the boils are caused by the high water table in that area and by concentrated impact loads, such as the large earth-moving equipment passing over the area causing it to rise and showing up as boils which seem to dry up when no movement is near. However, I plan to relieve the pressure so that it will not occur later on as a safety factor."

A November 1969 State inspection report notes that density reports on the embankment material were not satisfactory. The resident engineer indicated the tests were improperly performed and material was not compacted with a high moisture content. Also, the contractor was going to use another compactor and better results were expected. Operations were terminated for the winter, resuming again in 1970. Final inspection of the dam was performed on November 6, 1970, and the official inspection date is recorded as November 12, 1970. Contractor for this work was J. H. Beers, Inc. Participating Pennsylvania Fish Commission personnel include Mr. Edward R. Miller, chief engineer; Mr. Roy R. Frank, in charge of design; and Mr. Luke G. Fisher, resident engineer.

h. Normal Operating Procedures. Under normal conditions, reservoir outflow is controlled by a stoplog weir system located in the intake riser. Stoplogs are inserted in tracks inside the tower and the number of stoplogs determines the reservoir level. At the time of inspection, all stoplogs were in place and the elevation of the reservoir was at the level of the emergency spillway crest. Flows exceeding the capacity of the stoplog weirs are discharged over the emergency spillway located at the left abutment of the structure. Since wooden stoplogs are not completely sealed at the joints, water seeps through these joints. The base of the tower also contains a pipe valve, as shown on Plate 7, which is used as a downstream minimum flow release.

1.3 Pertinent Data.

A summary of pertinent data for Minsi Lake Dam is presented as follows.

a.	Drainage Area (sq miles)	3.7
b.	Discharge at Dam Site (cfs)	
	Maximum Known Flood at Site	Unknown
	At Top of Dam	3,974
c.	Elevation (feet above MSL)	
	Top of Dam	703.5
	Emergency Spillway Crest	698.0
	Intake Tower or Control Tower	
	Stoplog Weir Crest	698.0 (variable)
	Tower Inlet Invert	677.5
	Outlet Invert	677.0
	Top of Tower	706.67
d.	Reservoir (miles)	
	Length at Normal Pool	0.5
	Fetch at Normal Pool	0.5
e.	Storage (acre-feet)	
	Normal Pool/Emergency Spillway Crest	960
	To Top of Dam	1,793
f.	Reservoir Surface (acres)	
	Normal Pool	117
g.	Dam Data	
	Type	Zoned rolled earth
	Volume	Unknown
	Length	3,300 feet
	Maximum Height	26.5 feet
	Top Width	16 feet
	Freeboard at Normal Pool	5.5 feet
	Side Slope	
	Upstream	3H:1V
	Downstream	2.5H:1V
	Cutoff	12 foot wide cutoff trench at base under centerline.
	Grout Curtain	None
h.	Principal Spillway	
	Type	Standard Fish Commission control tower w/ stoplogs.

	Minimum Flow	2" cast iron pipe & valve for minimum flow release.
	Emergency Drawdown	2' x 2' orifice at base of tower.
	Elevations	
	Weir	698.0
	Inlet Invert	677.5
	Outlet Invert	677.0
i.	Emergency Spillway	
	Type	Concrete trapezoidal weir, discharge chute & stilling basin.
	Size	80 feet wide
	Side Slopes	Vertical concrete retaining walls.

SECTION 2
ENGINEERING DATA

2.1 Design.

a. Data Available. A summary of engineering data for Minsi Lake Dam is presented on the checklist attached herein as Appendix A. Principal documents used for this report include inspection reports prepared by representatives of the Pennsylvania Fish Commission, boring logs, foundation report, the "Report Upon the Application of the Pennsylvania Fish Commission" dated April 23, 1969, as well as letters and other miscellaneous correspondence pertinent to the design and construction of the dam. In addition to these documents, there were also 21 photographs in the file covering various phases of construction.

b. Design Features. Principal design features of the embankment and appurtenant structures are illustrated on the plan, profile and cross-section plates enclosed in Appendix E as Plates 2 through 10. A description of the features is also presented in Section 1.2, "Description of Project".

2.2 Construction.

Based on documentation in DER files and discussions with Pennsylvania Fish Commission representatives, it is believed that the dam was constructed in general accordance with criteria established by the Pennsylvania Fish Commission. It is noted in Section 1.2, paragraph g, that some compaction problems were encountered. These problems were reportedly overcome and satisfactory materials placed in accordance with specification requirements. Construction photographs verified a few details which could not be observed during the field inspection.

2.3 Operational Data.

Minimum flow required by DER is maintained by a valve at the base of the intake tower. The dam and appurtenant facilities were designed to be operated without a dam tender, and no operational data is available. It is understood that the sluice gate is operated yearly with periodic maintenance of the sluice gate hoist.

2.4 Evaluation.

a. Availability. All engineering data reproduced in this report and studied for this investigation were provided by DER and the Fish Commission.

b. Adequacy. The data provided was adequate to evaluate the structure in accordance with Phase I inspection criteria.

c. Validity. There is no reason to question the validity of available data.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. Observations and comments of the field inspection team are contained in the checklist enclosed herein as Appendix B, and are summarized and evaluated in the following subsections. In general, the appearance of the facilities indicates that the dam and its appurtenances are reasonably well maintained and in good condition.

b. Dam. Visual inspection revealed no surface cracks other than minor cracking of the asphalt roadway on the crest. There were no unusual movements or cracking at or beyond the toe, neither was there sloughing or erosion of the embankment or abutment slopes. Embankment settlement on the order of five inches was observed around the intake riser, as shown on Photographs 1 and 10, Appendix D. Vertical and horizontal alignments were checked with a transit and found to be excellent. The upstream slope is paved with hand-placed block and is found to be in good condition, except at normal pool elevation where there are signs of deterioration associated with ice and wave action. This condition is shown on Photograph 12, Appendix D. The junction between the embankment and abutment is considered in good condition and there was no seepage observed beyond the downstream toe. Marshy conditions with standing water just beyond the downstream toe were observed; but most, if not all, can be attributed to poor drainage and natural topography. There was no evidence observed of seepage through the dam directly. Clear water was discharging from the toe drain outlets.

c. Appurtenant Structures.

1. Intake Tower. Exposed portions of the intake tower and outlet structure were inspected and found to be in good condition with no significant spalling, cracking or concrete deterioration. The outlet channel was inspected and found to be in good condition.

2. Emergency Spillway. The emergency spillway was observed to be in good condition with no signs of cracking, spalling or concrete deterioration. There was one small shallow surface slide noted on the left cut slope just downstream of the emergency spillway, but this has no effect on the ability of the spillway to pass flows.

d. Reservoir. Reconnaissance of the reservoir disclosed no evidence of significant siltation, slope instability or other features that would significantly affect the flood storage capacity of the reservoir. All slopes are well vegetated with grass or trees to the water's edge.

e. Downstream Channel. The channel downstream of the stilling basin is wide and protected with riprap and assessed to be in good condition. Downstream conditions are further described in Section 5.

3.2 Evaluation.

In summary, visual inspection of the structure disclosed no evidence of apparent past or present movement of the dam or its appurtenant facilities. Seepage or wet areas noted along the downstream toe, as shown on sheet 5a, were traced and assessed to be from natural drainage toward the toe of the dam, possibly from natural springs which are common to this swampy area.

Exposed portions of the intake riser were inspected and observed to be in good condition. The emergency spillway was also assessed to be in good condition.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures.

Normal operating procedures do not require a dam tender. Water level is maintained by a stoplog weir system inside the tower and by the emergency spillway. In the event it is necessary to lower the reservoir, the sluice gate at the base of the control tower can be opened by a hoist at the top of the tower or the stoplogs can be removed.

4.2 Maintenance of the Dam.

The dam is maintained by Pennsylvania Fish Commission personnel. Maintenance normally consists of cutting the grass and replacing concrete block on the upstream slope. As necessary, trash and other floating debris are removed from the shoreline.

4.3 Maintenance of Operating Facilities.

Maintenance of the operating facilities, which include the intake tower and spillway, is also performed by the Pennsylvania Fish Commission. There is evidence to indicate that the control tower is inspected periodically as the hoist was painted, greased and appeared to be functioning properly. Similarly, the spillway was also observed to be in good condition.

4.4 Warning Systems In Effect.

There are no warning systems in effect or procedures specifically established for this structure which are to be followed during exceedingly heavy rainfalls. However, a procedure is being prepared and will be instituted soon.

4.5 Evaluation.

Written operation/maintenance procedures and a warning system are currently being formulated. These draft procedures have been reviewed and appear to be comprehensive, covering the major components of the dam.

SECTION 5
HYDROLOGY/HYDRAULICS

5.1 Evaluation of Features.

a. Design Data. Two sets of hydraulic calculations, both marked "preliminary" were supplied by the Fish Commission. It is apparent from the calculations and DER files that the spillway was designed to discharge the value required by the Department of Forests and Waters' "C" curve. The required discharge of 3,974 cfs was provided. Other calculations made for this investigation are presented in Appendix C.

The small, mountaintop watershed has an approximate length of 2.5 miles and average width of 1.3 miles for a total area of 3.63 square miles. Elevations range from 1,534 feet in the upper reaches (the Appalachian Trail) to 698 at normal pool elevations. The watershed is 80 to 90 percent wooded with a few scattered homes. Runoff characteristics are not expected to change significantly in the near future.

In accordance with criteria established by Federal (OCE) Guidelines, the recommended spillway design flood for this "Intermediate" size dam and "High" hazard classification is the Probable Maximum Flood (PMF).

b. Experience Data. No reservoir water level records or precipitation records are maintained. There is no estimate of previous high water levels.

c. Visual Observations. On the date of inspection, there were no conditions observed that would indicate a reduced spillway capacity during a flood occurrence. Other observations regarding the condition of the downstream channel, spillway and reservoir are located in Appendix B and discussed in Section 3.

d. Overtopping Potential. Overtopping potential of this dam was estimated using "HEC-1, Dam Safety Version", computer program. A brief description of the program and a summary of the dam safety analysis are included in Appendix C. Calculations for this investigation essentially confirm the design spillway capacity, with an estimated discharge of 3,942 cfs, with the reservoir level at the top of the dam. The HEC-1 program computed the peak PMF inflow to be 7,393 cfs. The spillway can pass approximately 70 percent of the PMF without overtopping the embankment.

e. Spillway Adequacy. The spillway is considered to be "Inadequate" but not "Seriously Inadequate" as the dam will pass more than 50 percent of the PMF without overtopping the embankment.

f. Downstream Conditions. About 1,000 feet below the outlet of the spillway channel, East Branch Martins Creek passes under LR 48032 and the stream valley becomes wide, flat and marshy. On LR 48032 near the creek are two homes subject to damage in the event of failure. About 5,000 feet farther downstream, the East Branch joins the West Branch and the stream channel becomes narrow and steep. The valley becomes progressively narrower and steeper toward Bangor, about four miles below the dam. Near the intersection of State Route 191 and LR 48089 are several homes subject to damage in the event of dam failure. In conclusion, it is evaluated that significantly greater downstream damage would result from failure of the dam during a PMF than damage resulting from large flows during passage of the PMF.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. Field inspection disclosed no evidence of potential instability of the embankment or its components. Embankment slopes are reasonably uniform with no signs of displacement or sloughing. Settlement of the embankment on the order of five inches was noted adjacent to the control tower. Considering the compaction problems noted and discussed in Section 3, this settlement could be expected.

The condition of the upstream block was assessed to be good, except for isolated places along normal pool level where some deterioration due to frost and waves has occurred. However, this is apparently being cared for on a routine basis. Exposed portions of the intake tower were inspected and judged to be in good condition. Similarly, the emergency spillway was also judged to be in good condition.

There was no exterior evidence indicating abnormal seepage through the embankment. Wet zones at the downstream toe were traced to topographic conditions where surface runoff drains towards the toe of the dam.

b. Design and Construction Data. All available design documentation, calculations and other data received from the Department of Environmental Resources and the Fish Commission were assessed and reviewed. A listing of this data is included herein as Appendix A and discussed in Section 2.

Design documentation was considered adequate to evaluate the structure. The stability analyses in Fish Commission files indicate a factor of safety for steady state seepage conditions in excess of 2.0. Design data included geologic information and a foundation investigation report. Test borings and soil tests performed by various contractors were also reviewed and assessed to be complete.

c. Operating Records. There are no operating procedures for this dam. However, procedures are currently being prepared and will be implemented in the near future.

d. Post-Construction Changes. There are no construction changes reported to have been made to this structure since construction.

e. Seismic Stability. The dam is located in Seismic Zone 1. Normally it can be considered that if a dam in this zone is stable under static conditions, it can be assumed safe for any expected earthquake conditions. Since the stability analysis shows a factor of safety for steady state seepage conditions of at least 2.0, seismic stability of the dam has also been satisfied.

SECTION 7
ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Evaluation. Visual inspection and review of design and construction documentation indicate the dam, foundation and appurtenant facilities of Minsi Lake Dam are in reasonably good condition. The hydrologic/hydraulic computations presented in Section 5 and Appendix C indicate the dam will pass about 70 percent of the Probable Maximum Flood without overtopping. Therefore, the spillway system for this structure is considered to be "Inadequate". In the event of failure, significantly more property damage would be expected than just prior to failure as a result of high flows. Since the structure is located upstream of several populated areas, it is considered a "High" hazard potential dam.

b. Adequacy of Information. Combined design information, construction data, visual inspection and obvious performance history of this structure were sufficient to evaluate the dam and appurtenant facilities.

c. Need for Additional Studies. At the present time, it is not believed that additional studies are necessary.

d. Urgency. It is concluded that recommendations presented in Section 7.2 be implemented as soon as practical.

7.2 Remedial Measures.

a. Facilities. The following recommendations are presented. All engineering evaluations for corrective work or the need for corrective work should be reviewed by a registered professional engineer experienced in the design of dams.

1. The marshy area at the toe of the structure should be regraded and drained away from the dam. Subsequently, seepage should be monitored to determine whether it flows through the embankment. Should it be determined that seepage flows through the embankment, appropriate remedial measures should be taken to control this flow.

2. Concrete block on the upstream slopes should continue to be monitored, especially during the spring of each year. Deteriorated block should be removed and replaced with new block.

b. Operation and Maintenance Procedures. Operation/maintenance and warning procedures, which have been written by the Fish Commission, should be established as soon as practical. They should include procedures for monitoring the structure during the passage of unusually large flows and should include provisions for warning or evacuating downstream residents, if conditions warrant.

APPENDIX

A

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM *Minsi Dam*

ID # *PA 00788*

ITEM	REMARKS
AS-BUILT DRAWINGS	*1968 design drawings are available as found in DER files.*
REGIONAL VICINITY MAP	*See Plate 1, Appendix E.*
CONSTRUCTION HISTORY	*See Section 1.2 paragraph "g" of report.*
TYPICAL SECTIONS OF DAM	*See Appendix E.*
OUTLETS - PLAN	*See Appendix E.*
DETAILS	
CONSTRAINTS	
DISCHARGE RATINGS	*- See Section 5 and Appendix C.*
RAINFALL/RESERVOIR RECORDS	*- Not available.*

ITEM	REMARKS
DESIGN REPORTS	1. *Foundation report submitted to DER (11 Feb. 66) by consultant but the document could not be located in DER files.* 2. *Document was reviewed in Fish Commission files.*
GEOLOGY REPORTS	1. *Geology data is presented in the "Report Upon the Application", 23 April 1969.* 2. *Additional geologic data is presented in Appendix F.* 3. *Design Geologic data found in Foundation Report located in Fish Commission files.*
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY *(1)* SEEPAGE STUDIES	*- Not available in DER files.* *- Stage-storage cases in DER files.* *Not available in DER files.* 1. *Dam Stability: End of Construction - F.S. = 2.76* *Steady State - - F.S. = 2.00* 2. *Foundation Report includes seepage evaluation.*
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	*Test Borings by "Boring Soils and Testing Company" and F.T. Kitlinski and Associates in DER files.*
POST-CONSTRUCTION SURVEYS OF DAM	*None.*
BORROW SOURCES	*- Soil tests by F.T. Kitlinski and Associates.*

ITEM	REMARKS
MONITORING SYSTEMS	*None.*
MODIFICATIONS	*None.*
HIGH POOL RECORDS	*Unknown.*
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	*None.*
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	*None.*
MAINTENANCE OPERATION RECORDS	*Yes. Data reviewed in Fish Commission files. Operational, Maintenance Manual and Warning Procedures were also found and reviewed in Fish Commission files.*

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	*See Appendix E.*
OPERATING EQUIPMENT PLANS & DETAILS	*See Appendix E.*
MISCELLANEOUS	1. *"Application of the Commonwealth of Pennsylvania", 12 March 1969.* 2. *"Report Upon the Application of the Pennsylvania Fish Commission", April 23, 1969.* 3. *Pennsylvania Fish Commission Resident Engineer reports by Mr. Roy R. Frank.* 4. *Inspection Reports by DER with 21 black and white photographs.*

APPENDIX

B

CHECK LIST
VISUAL INSPECTION
PHASE I

Name Dam *Minsi Dam* County *Northampton* State *Pennsylvania* National ID # *PA 00788*

Type of Dam *Rolled earth* Hazard Category *I-High*

Date(s) Inspection *19 April 1979* Weather *Clear, cool, windy* Temperature *40's*

Pool Elevation at Time of Inspection *698* M.S.L. Tailwater at Time of Inspection *N/A* M.S.L.

Inspection Personnel:

John Boschuk, Jr. (Geotechnical) *Mary F. Beck (Hydologist)* *John H. Frederick (Geotechnical)*

Raymond Lambert (Geologist) *Vincent McKeever (Hydraulic)*

John Boschuk, Jr. Recorder

Remarks:

Messrs. E.J. Grindall and R. Stickler from the Pennsylvania Fish Commission were present and provided assistance.

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	*N/A*	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	*N/A*	
DRAINS	*N/A*	
WATER PASSAGES	*N/A*	
FOUNDATION	*N/A*	

CONCRETE/MASONRY DAMS

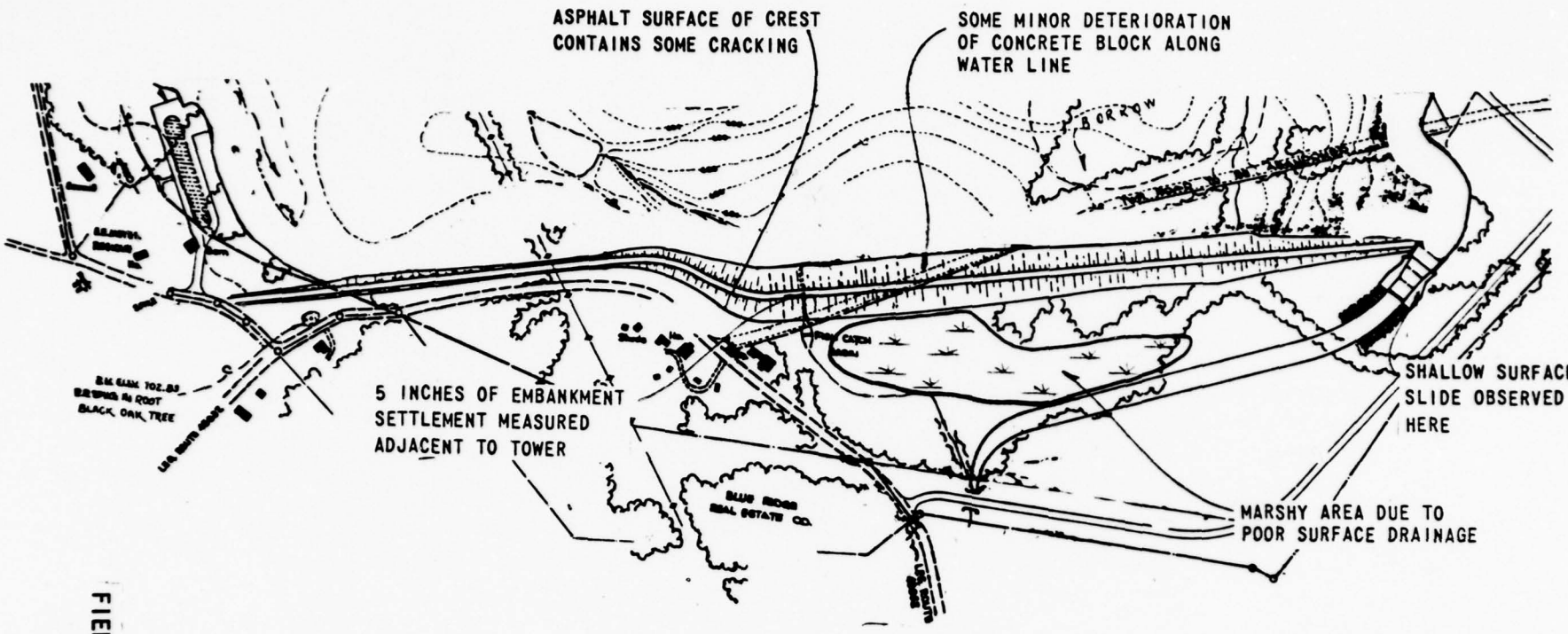
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	*N/A*	
STRUCTURAL CRACKING	*N/A*	
VERTICAL AND HORIZONTAL ALIGNMENT	*N/A*	
MONOLITH JOINTS	*N/A*	
CONSTRUCTION JOINTS	*N/A*	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	*None observed. Minor cracking of the asphalt walkway on the crest was noted but this does not effect the structure.*	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	*None observed.*	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	*None observed.*	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	*Excellent.*	
RIPRAP FAILURES	*None observed. Upstream slope is protected with concrete block. At normal pool level this block shows signs of deterioration from ice and wave action. See photograph in Appendix D.*	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	*Good condition.*	
ANY NOTICEABLE SEEPAGE	*None observed. The marshy areas with standing water just beyond the downstream is attributed to poor drainage and the natural topography. There was no evidence found of seepage through the dam.*	
STAFF GAGE AND RECORDER	*None.*	
DRAINS	*Clear toe drain discharge through the principal spillway outlet structure and was observed and assessed to be functioning as designed.*	



FIELD OBSERVATION PLAN
MINSI DAM

SHEET 5A OF 11

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	*None observed.*	
INTAKE STRUCTURE	*The accessable portions of the riser were inspected and observed to be in good condition. Settlement on the order of 5 inches was noted around the intake structure as shown on the photographs in Appendix D.*	
OUTLET STRUCTURE	*Good condition.*	
OUTLET CHANNEL	*Good condition.*	
EMERGENCY GATE	*Good condition.*	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	*Good condition.*	
APPROACH CHANNEL	*Good condition.*	
DISCHARGE CHANNEL	*Good condition.*	
BRIDGE AND PIERS	*N/A*	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	*N/A*	
APPROACH CHANNEL	*N/A*	
DISCHARGE CHANNEL	*N/A*	
BRIDGE AND PIERS	*N/A*	
GATES AND OPERATION EQUIPMENT	*N/A*	

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	*None*	
OBSERVATION WELLS	*None*	
WEIRS	*None*	
PIEZOMETERS	*None*	
OTHER	*None*	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	*Reservoir side slopes flat, well vegetated with trees and grass to water's edge.*	
SEDIMENTATION	*Minimal, no effect on flood storage.*	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	*The channel downstream of the stilling basin is wide, protected by riprap and in good condition.*	
SLOPES	*The valley gradient is approximately 0.0025.*	
APPROXIMATE NO. OF HOMES AND POPULATION	*About 1500 feet below the dam are two houses built in flood plain. About 3.5 miles below the dam are several more houses. The stream then enters Bangor, Pennsylvania.*	

APPENDIX

C

MINSI DAM

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: *Mountain top, 80% wooded, less than 5% residential development.*

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): *698.0 feet (960 Acre-Feet).*

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): *703.5 feet (1793 Acre-Feet).*

ELEVATION MAXIMUM DESIGN POOL: ----

ELEVATION TOP DAM: *703.5 feet.*

SPILLWAY

a. Elevation *698.0 feet.*

b. Type *Trapazoidal weir.*

c. Width *80 feet.*

d. Length *About 150 feet.*

e. Location Spillover *Left abutment*

f. Number and Type of Gates *None*

OUTLET WORKS:

a. Type *Standard Fish Commission intake tower.*

b. Location *Station 17 + 65.*

c. Entrance inverts *697.5 feet.*

d. Exit inverts *677.0 feet*

e. Emergency draindown facilities *A 24" by 24" sluice gate at the bottom of the tower.*

HYDROMETEOROLOGICAL GAGES:

a. Type *None.*

b. Location *Not available.*

c. Records *Not available.*

MAXIMUM NON-DAMAGING DISCHARGE: *Not estimated.*

HEC-1, REVISED
FLOOD HYDROGRAPH PACKAGE

The original "Flood Hydrograph Package" (HEC-1), developed by the Hydrologic Engineering Center, Corps of Engineers, has been modified for use under the National Dam Inspection Program. The "Flood Hydrograph Package (HEC-1), Dam Safety Version", hereinafter referred to as, HEC-1, Rev., has been modified to require less detailed input and to include a dam breach analysis. The required input is obtained from the field inspection of a dam, any available design/evaluation data, relatively simple hydraulic calculations, or information from the USGS Quandrangle maps. The input format is flexible in order to reflect any unique characteristics of an individual dam.

HEC-1, Rev. computes a reservoir inflow hydrograph based on individual watershed characteristics such as: area, percentage of impervious surface area, watershed shape, and hydrograph characteristics determined from regional correlation studies by the Corps of Engineers, Baltimore District. The inflow is routed through the reservoir using spillway discharge data obtained from the field inspection or design data. Flood storage capacity is determined from USGS maps or design information and verified by the field inspection. In the event a spillway cannot discharge 0.5 PMF without overtopping and failure of the dam, downstream channel characteristics obtained from the field inspection and USGS maps are inputed and flows are routed downstream to the damage center and a dam breach analysis is performed.

Included in this Appendix are the HEC-1, Rev. pertinent input values and a summary print-out tables.

Classification (Ref- Recommended Guidelines for Safety Inspection of Dams)

1. The hazard potential is "High" as failure would result in loss of life.

2. The size classification is "Intermediate" based on its 1793 Ac-ft. total storage capacity.

3. The spillway design flood, based on size and hazard classification, is the Probable Maximum Flood (PMF).

Hydrology and Hydraulic Analysis

1. Original Design Data - The spillway was designed to discharge not less than 3974 cfs, the required discharge for a 3.7 sq. mile drainage area and the Dept. of Forests and Waters "C" curve.

The weir is 80 ft. long
C = 3.82
maximum H = 5.5 ft.

2. Evaluation of structure was by use of the computer program. Computer input data as follows:

Inflow Hydrograph
rainfall, shown on sheet 6. Ref - Hydrometerological Report No. 33.
drainage area, determined from USGS map, 3.63 sq miles - use 3.7
Snyder's hydrograph parameters, tp & Cp
$t_p = C_t (L \cdot L_{ca})^{0.3}$
$C_t = 1.23$ } Information received from Corps of
$C_p = 0.45$ } Engineers, Baltimore, for Zone 1
$L = 3.125$ miles } from USGS
$L_{ca} = 1.515$ miles } map
$t_p = 1.96$

Reservoir Routing
elevation-storage, shown on sheet 7.
normal storage from "Application Report"
flood storage measured from drawing dated 4-10-68 and enclosed as Plate 2, Appendix E

BY MEB DATE 5/23/79 SUBJECT Minis Lake Dam SHEET 4 OF 8

CHKD. BY DATE Hydrology / Hydraulics JOB No.

elevation - discharge, calculated by computer program.

L = 80 ft field checked

C = 3.82 Table 5-9, Brater & King, Handbook of Hydraulics

Overtopping Potential - as shown on sheet 8, the dam is overtopped by 0.7 PMF.

Spillway Adequacy - as the spillway discharges about 0.60 PMF without overtopping the dam, the spillway is rated as "Inadequate" but not "Seriously Inadequate."

MFB 5/24/79 Minis Lake Dam Hydrology / Hydraulics 34 of 83

```
1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************

 RUN  DATE* 79/05/24.
      TIME* 10.09.26.
```

MINIS LAKE DAM
NAT ID NO. PA 00788 DER NO. 48-139
OVERTOPPING ANALYSIS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	0	15	0	0	0	0	0	-4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1

RTIOS=	.50	.60	.70	.80	.90	1.00

MFB 5/24/79 Minis Lake Dam Hydrology / Hydraulics SH. 6 OF 8

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
IN	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.70	0.00	3.70	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	111.00	124.00	134.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.96 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 71 END-OF-PERIOD ORDINATES, LAG= 1.97 HOURS, CP= .45 VOL= 1.00

22.	83.	169.	270.	374.	463.	525.	554.	540.	501.
462.	427.	394.	364.	336.	311.	287.	265.	245.	226.
209.	193.	178.	164.	152.	140.	129.	120.	110.	102.
94.	87.	80.	74.	68.	63.	58.	54.	50.	46.
42.	39.	36.	33.	31.	29.	26.	24.	22.	21.
19.	18.	16.	15.	14.	13.	12.	11.	10.	9.
9.	8.	7.	7.	6.	6.	5.	5.	5.	4.
4.									

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM	24.99	22.62	2.37		195016.
	(635.)	(575.)	(60.)		(5522.24)

MFB 5/24/79 Minis Lake Dam Hydrology / Hydraulics SH. 7 OF 8

HYDROGRAPH ROUTING

OUTFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
OUT	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-698.	0

CAPACITY=	0.	960.	1793.	2972.
ELEVATION=	680.	698.	704.	708.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
698.0	80.0	3.8	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
703.5	0.0	0.0	0.

CREST LENGTH	273.	3027.	3300.	3300.
AT OR BELOW ELEVATION	703.5	703.7	703.8	706.0

MFB 5/24/79 Minis Lake Dam Hydrology / Hydraulics SH. 8 OF 8

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .50	RATIO 2 .60	RATIO 3 .70	RATIO 4 .80	RATIO 5 .90	RATIO 6 1.00
HYDROGRAPH AT	IN	3.70	1	3696.	4436.	5175.	5914.	6654.	7393.
	(	9.58)	(	104.67)(	125.60)(	146.54)(	167.47)(	188.41)(	209.34)(
ROUTED TO	OUT	3.70	1	2810.	3446.	4084.	5167.	6148.	7039.
	(	9.58)	(	79.56)(	97.57)(	115.64)(	146.32)(	174.10)(	199.32)(

1 SUMMARY OF DAM SAFETY ANALYSIS

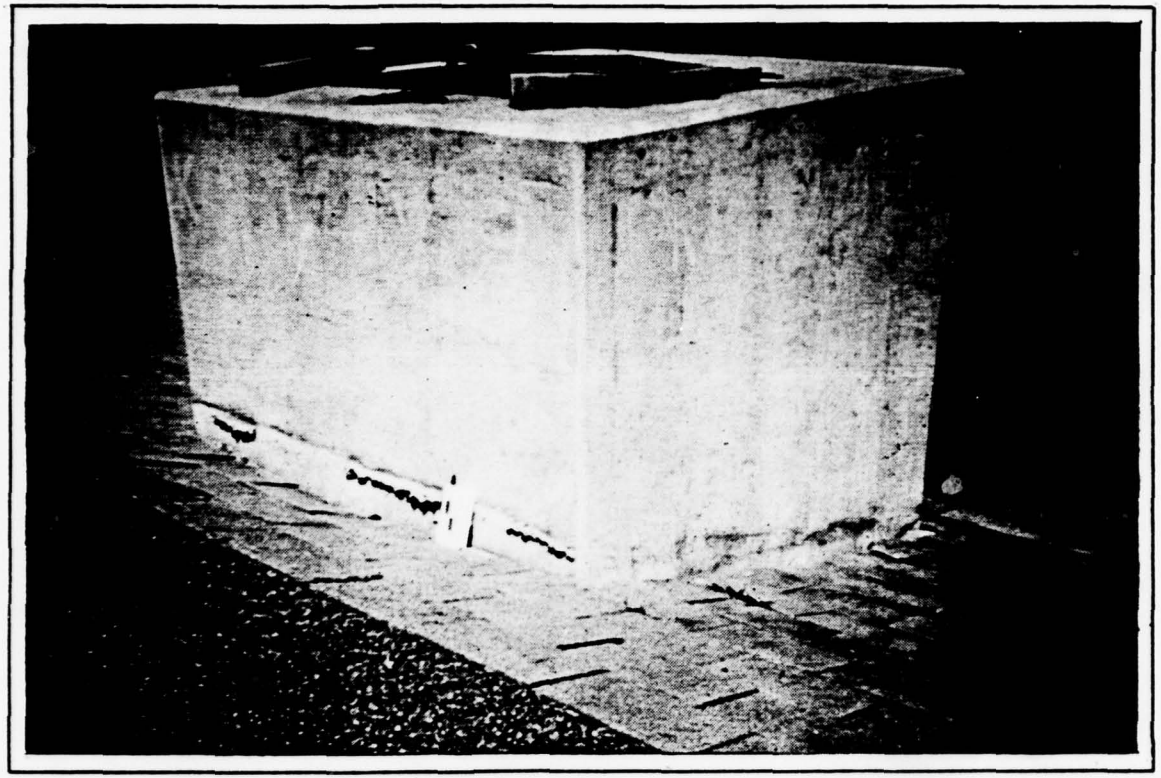
PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	698.00	698.00	703.50
STORAGE	960.	960.	1793.
OUTFLOW	0.	0.	3942.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	702.39	0.00	1625.	2810.	0.00	43.75	0.00
.60	703.03	0.00	1722.	3446.	0.00	43.50	0.00
.70	703.58	.08	1815.	4084.	1.50	43.50	0.00
.80	703.80	.30	1871.	5167.	3.00	43.00	0.00
.90	703.91	.41	1901.	6148.	3.75	42.75	0.00
1.00	704.00	.50	1924.	7039.	4.25	42.50	0.00

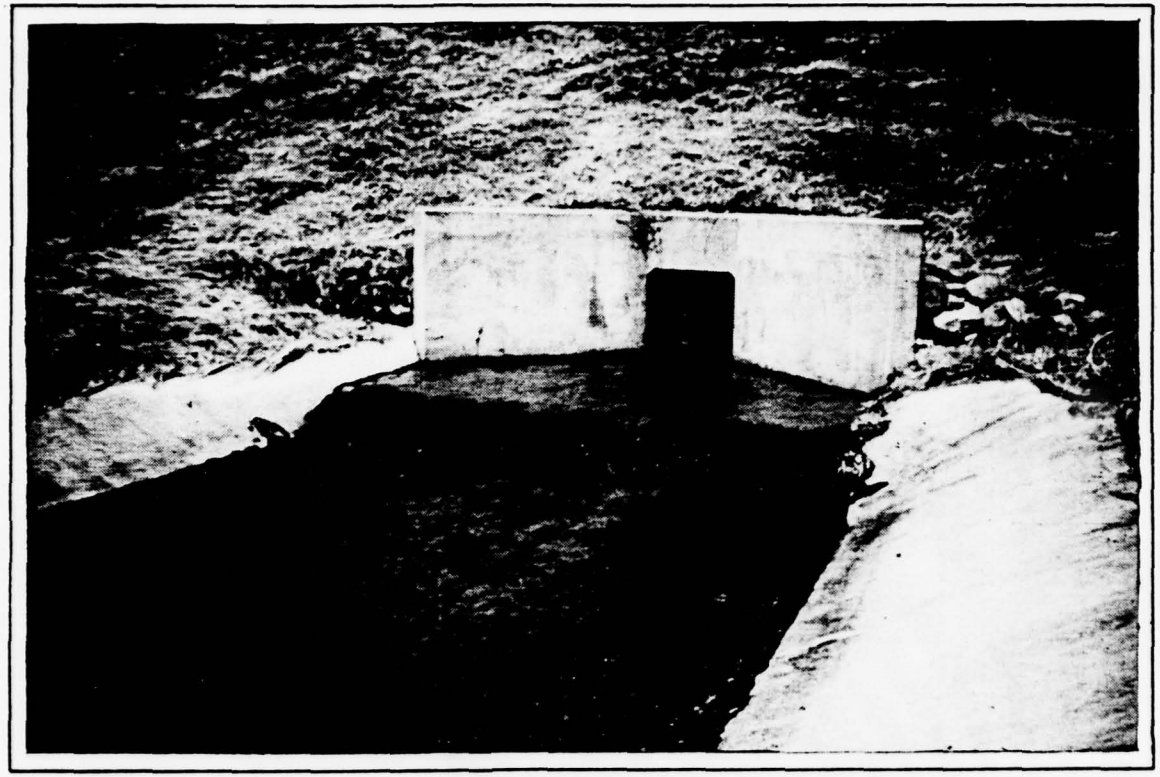
APPENDIX

D



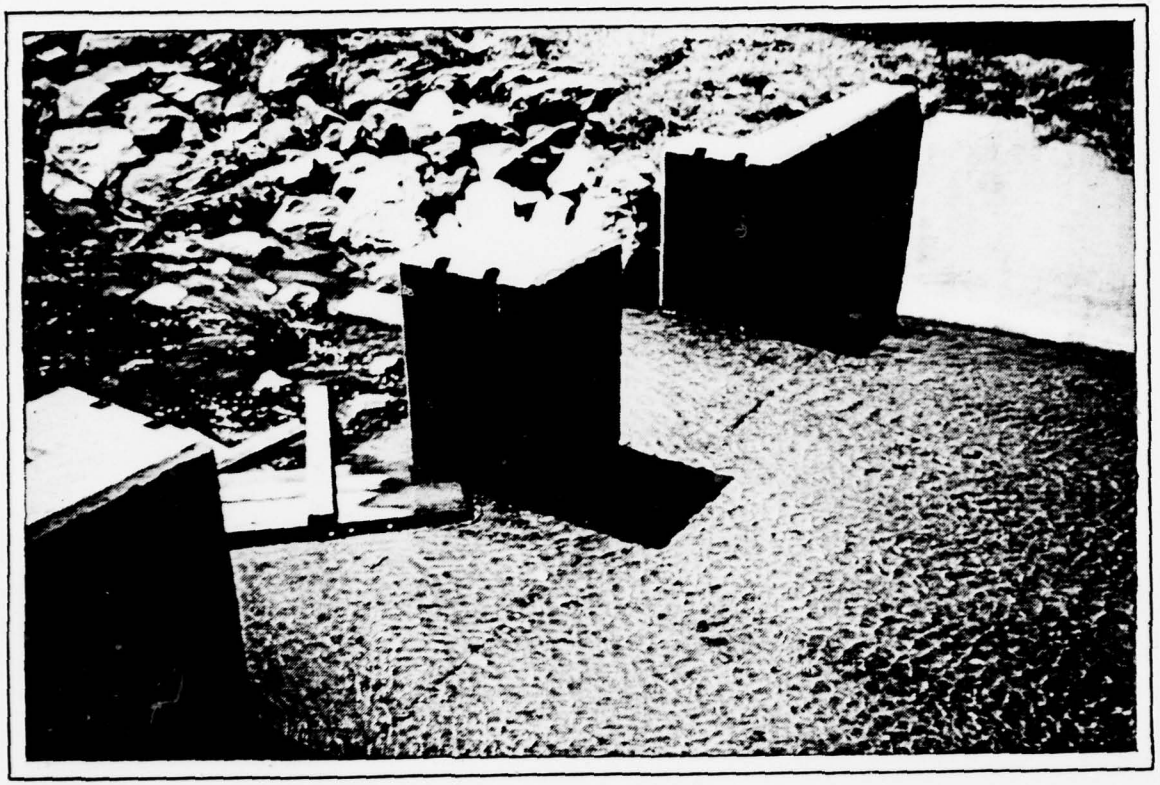
OVERVIEW OF PRINCIPAL SPILLWAY
INLET STRUCTURE.

PHOTOGRAPH NO. 1



OVERVIEW OF PRINCIPAL SPILLWAY OUTLET STRUCTURE.

PHOTOGRAPH NO. 2



STILLING BASIN OF PRINCIPAL SPILLWAY.
NOTE TRACKS IN STRUCTURE FOR
FLASHBOARDS FOR INSTALLATION AS
FISH CATCH BASIN.

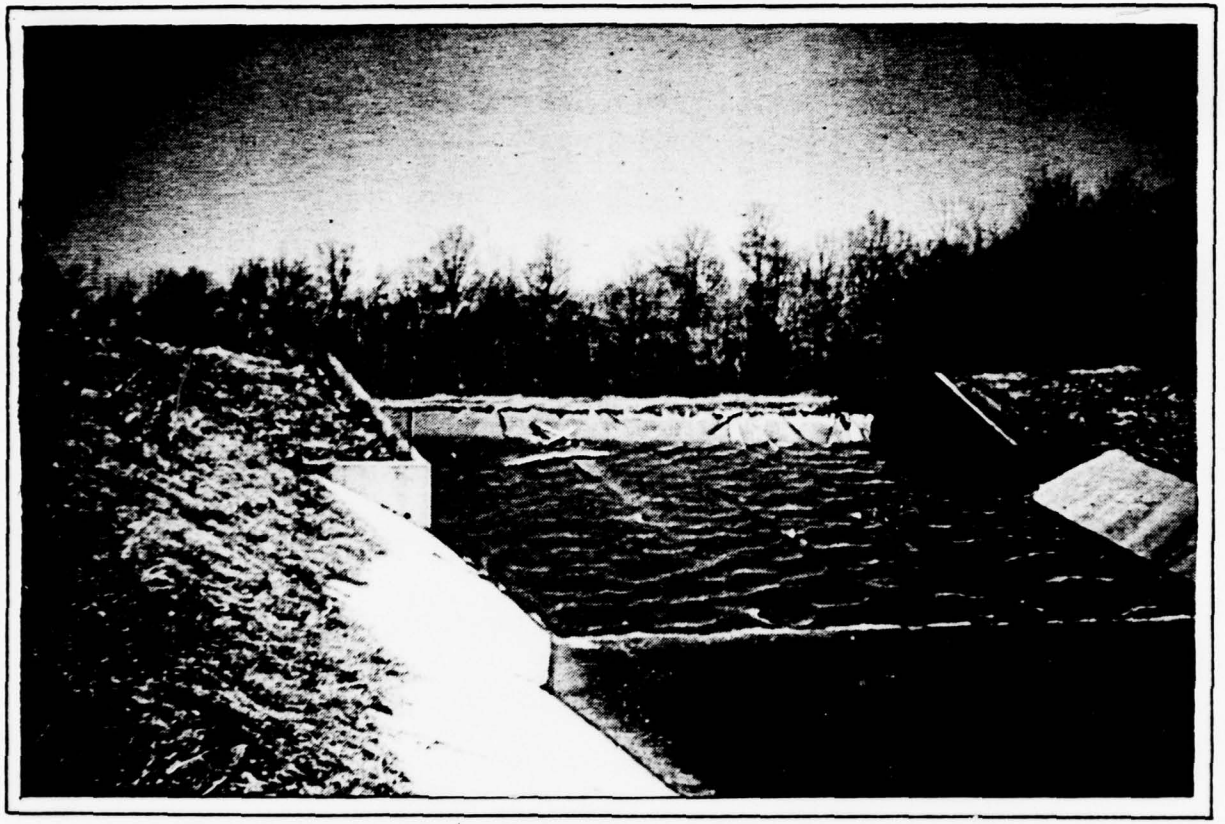
PHOTOGRAPH NO. 3

OVERVIEW OF PRINCIPAL SPILLWAY
STILLING BASIN AND DISCHARGE
CHANNEL.

PHOTOGRAPH NO. 4

OVERVIEW OF EMERGENCY SPILLWAY
LOOKING TOWARDS THE LEFT
ABUTMENT.

PHOTOGRAPH NO. 5



EMERGENCY SPILLWAY LOOKING UPSTREAM.

PHOTOGRAPH NO. 6

OVERVIEW OF EMERGENCY SPILLWAY
DISCHARGE CHANNEL.

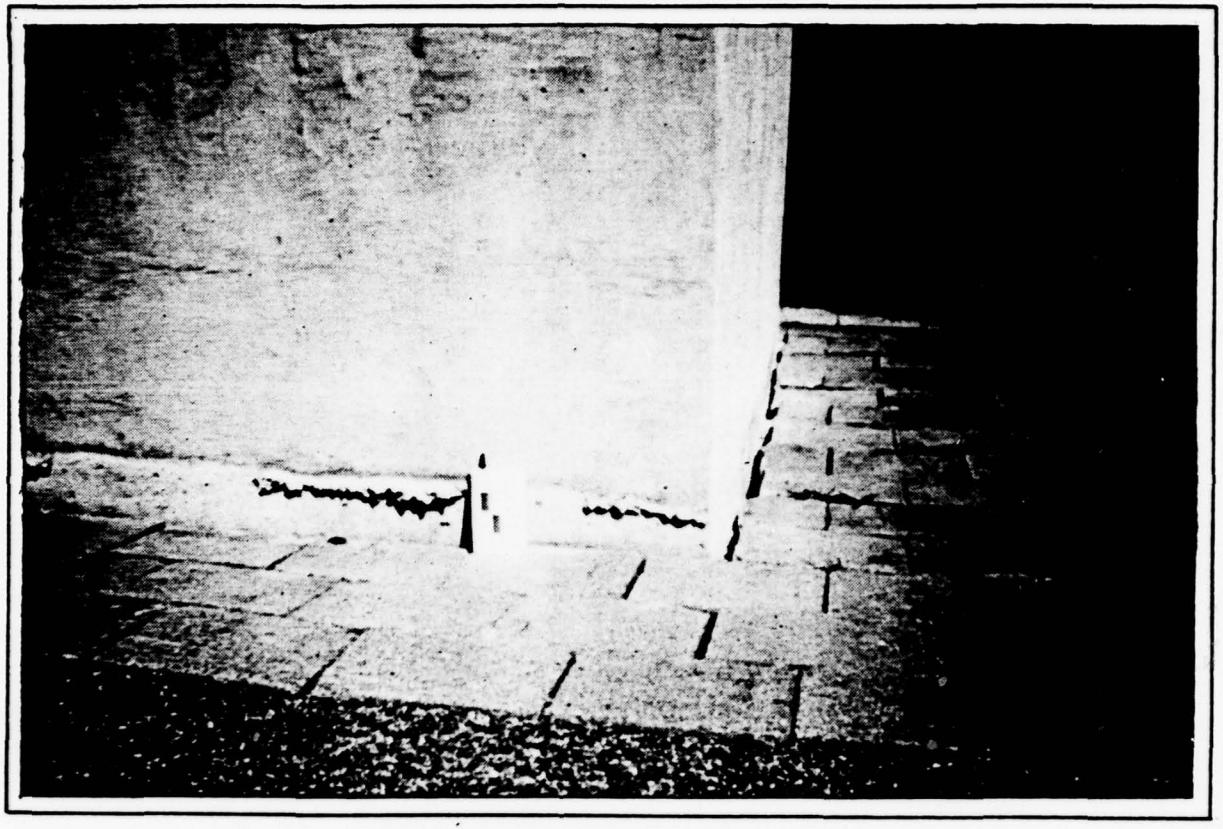
PHOTOGRAPH NO. 7

TYPICAL VIEW OF UPSTREAM SLOPE
PROTECTED WITH CONCRETE BLOCKS.

PHOTOGRAPH NO. 8

TYPICAL VIEW OF DOWNSTREAM SLOPE.

PHOTOGRAPH NO. 9

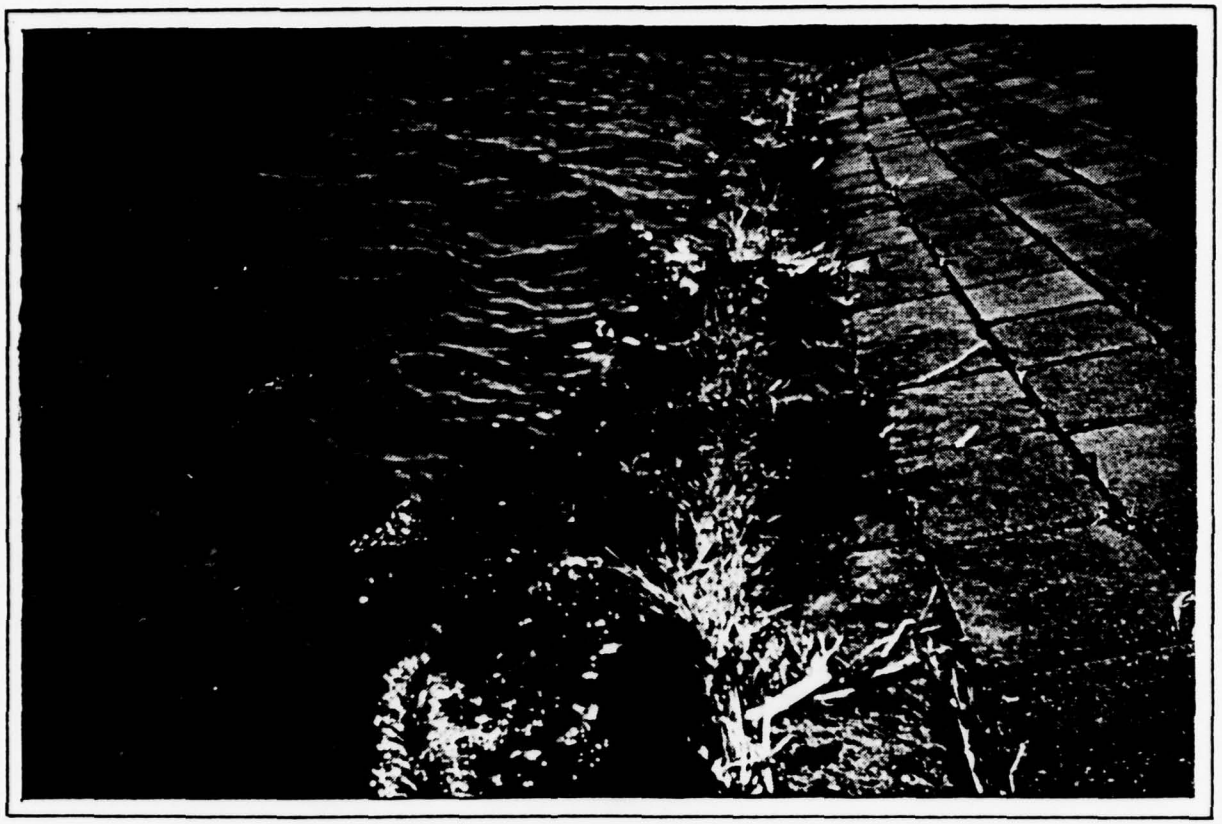


SETTLEMENT AROUND THE PRINCIPAL SPILLWAY INLET TOWER. SETTLEMENT AVERAGED ABOUT FIVE INCHES.

PHOTOGRAPH NO. 10

SURFACE SLIDE ON CUT SLOPES, LEFT
SIDE OF EMERGENCY SPILLWAY.

PHOTOGRAPH NO. 11



TYPICAL CONDITION OF CONCRETE BLOCK
SLOPE FACING AT NORMAL POOL ELEVATION.
NOTE DETERIORATION.

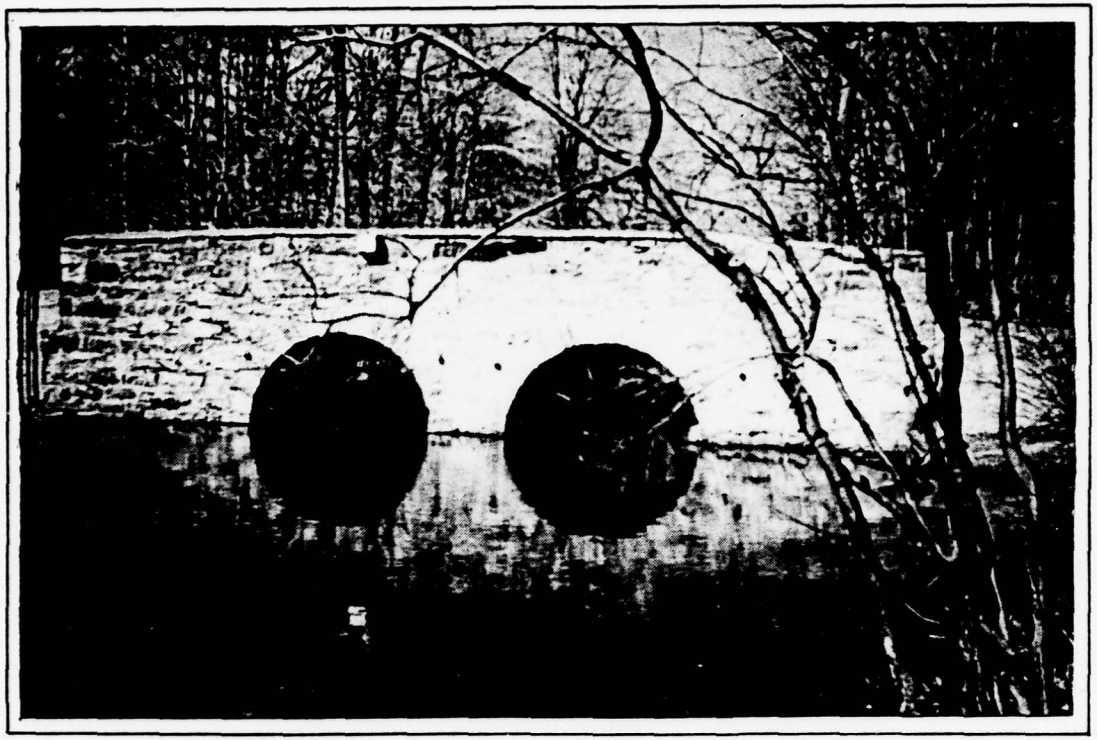
PHOTOGRAPH NO. 12

DRAINAGE CULVERT ALONG DOWNSTREAM
TOE OF DAM ADJACENT TO ROADWAY.
THE EMBANKMENT IS ON THE RIGHT AND
THE ROAD ON THE LEFT.

PHOTOGRAPH NO. 13

STAGNANT WATER ALONG THE TOE OF
DAM CAUSED BY POOR SURFACE DRAINAGE
AWAY FROM STRUCTURE.

PHOTOGRAPH NO. 14

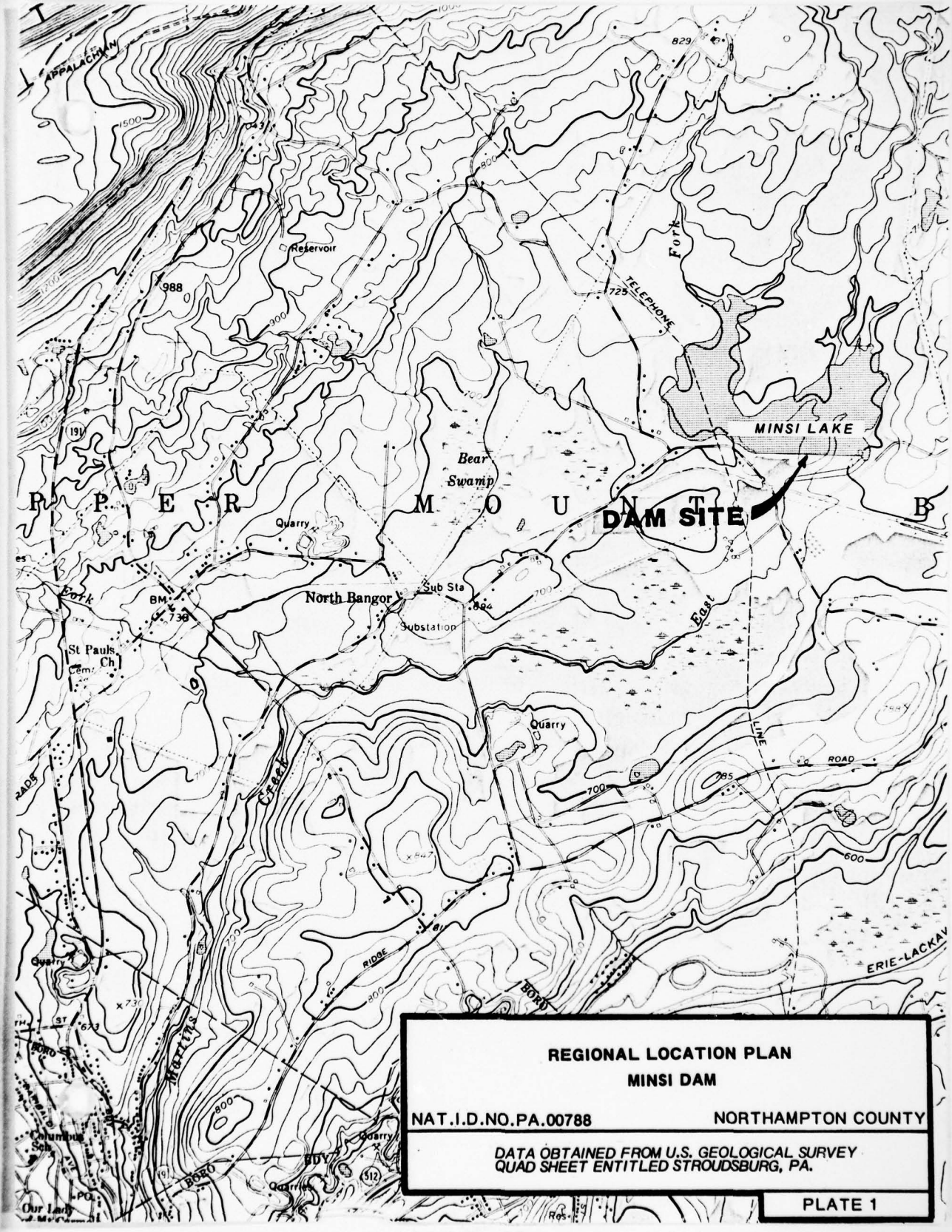


VIEW OF DOWNSTREAM BRIDGE.

PHOTOGRAPH NO. 15

APPENDIX

E



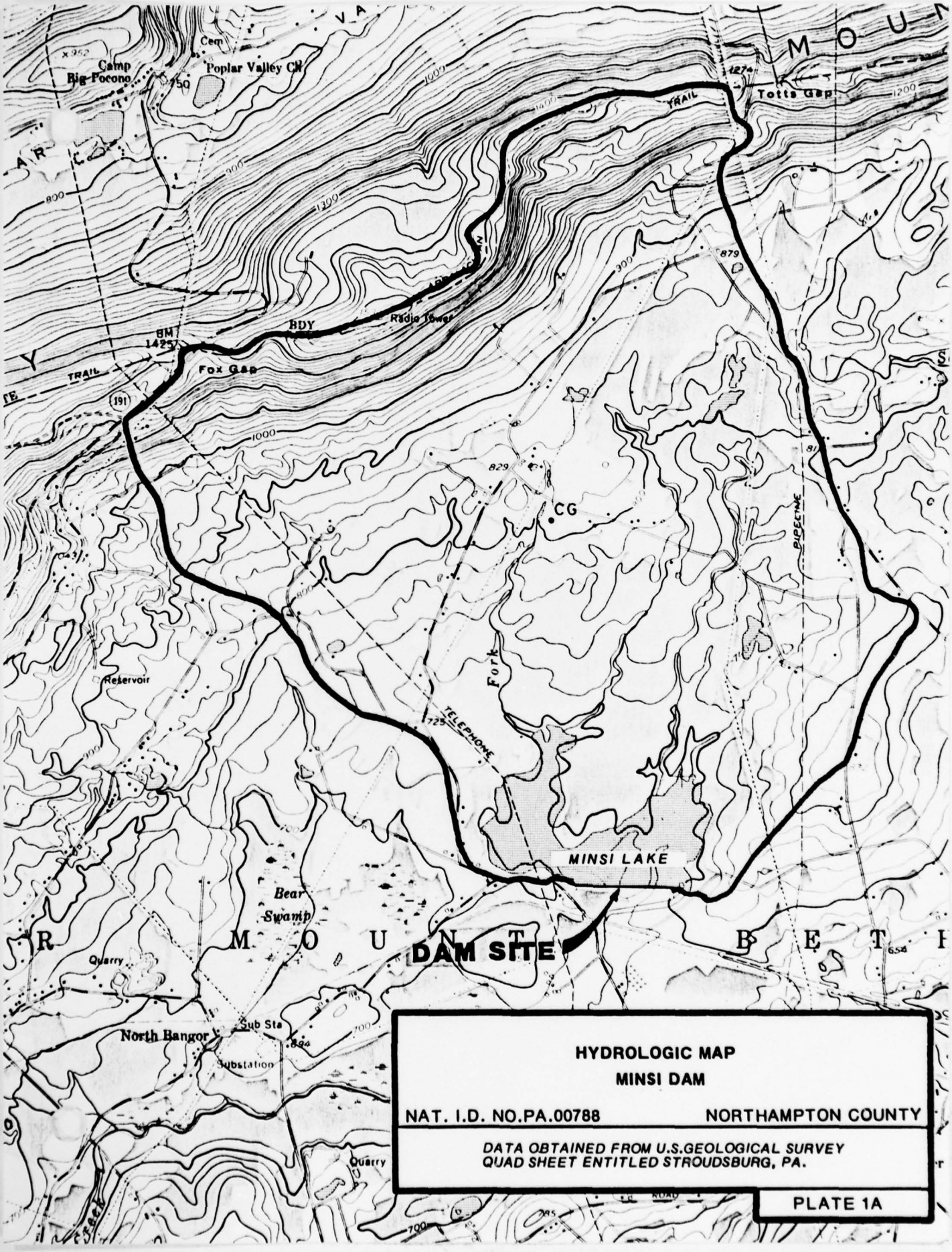
REGIONAL LOCATION PLAN

MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM U.S. GEOLOGICAL SURVEY QUAD SHEET ENTITLED STROUDSBURG, PA.

PLATE 1



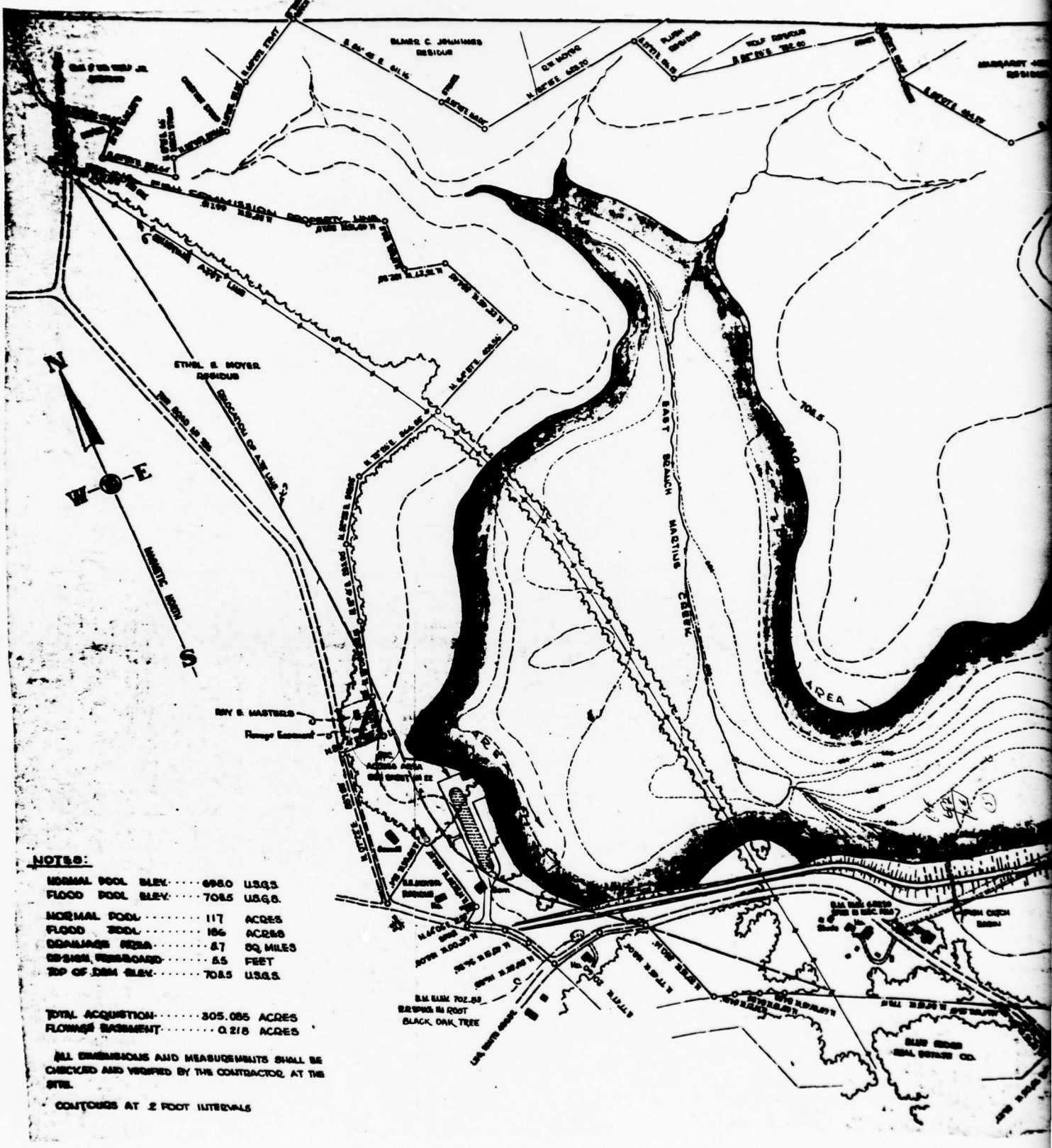
HYDROLOGIC MAP

MINSI DAM

NAT. I.D. NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM U.S.GEOLOGICAL SURVEY QUAD SHEET ENTITLED STROUDSBURG, PA.

PLATE 1A



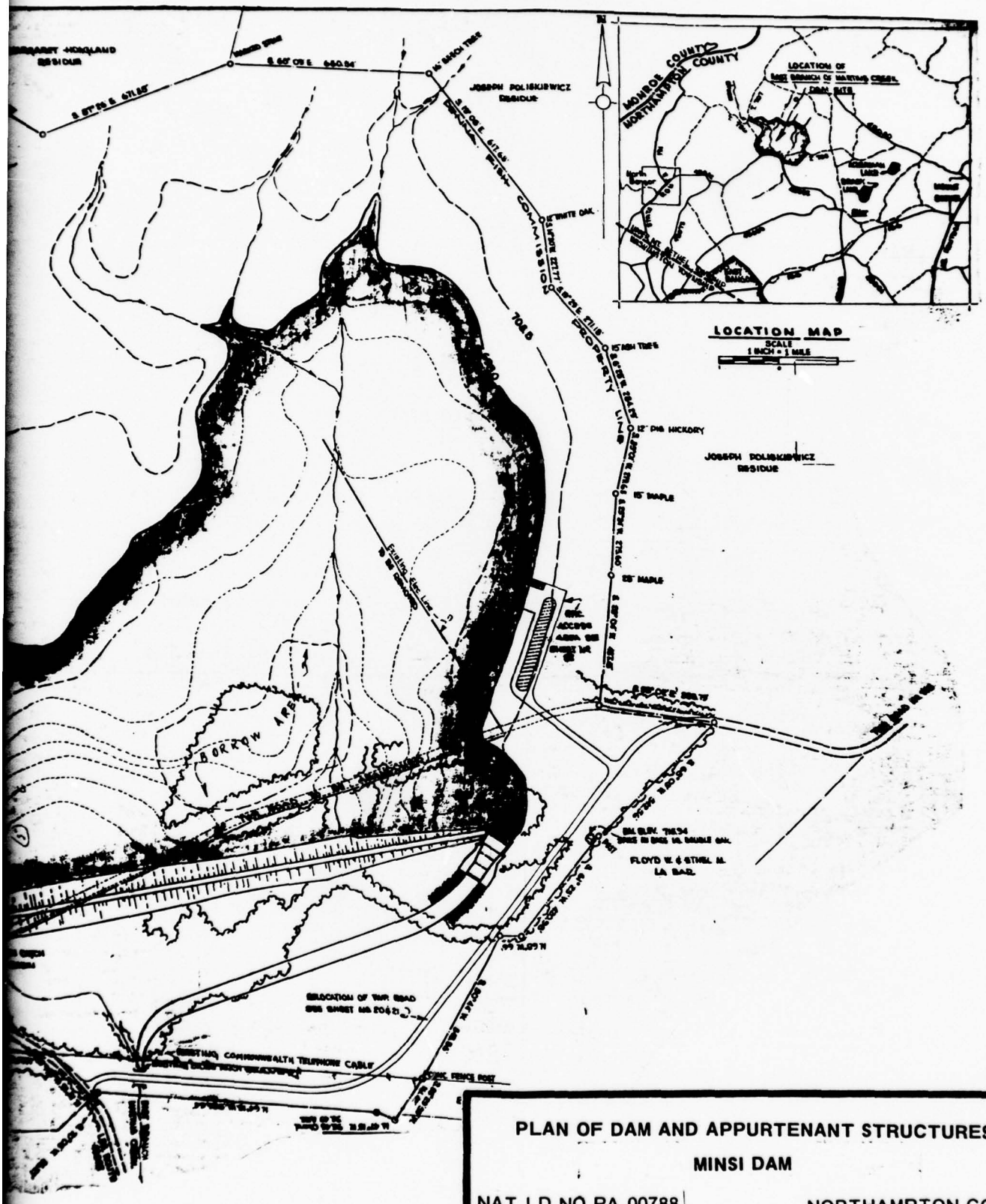
NOTES:

NORMAL POOL ELEV.	698.0	U.S.G.S.
FLOOD POOL ELEV.	708.5	U.S.G.S.
NORMAL POOL	117	ACRES
FLOOD POOL	186	ACRES
DRAINAGE AREA	8.7	SQ. MILES
DAM FREEBOARD	5.5	FEET
TOP OF DAM ELEV.	708.5	U.S.G.S.

TOTAL ACQUISITION	305.085	ACRES
FLOWAGE EASEMENT	0.218	ACRES

ALL DIMENSIONS AND MEASUREMENTS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE.

CONTOURS AT 2 FOOT INTERVALS



2

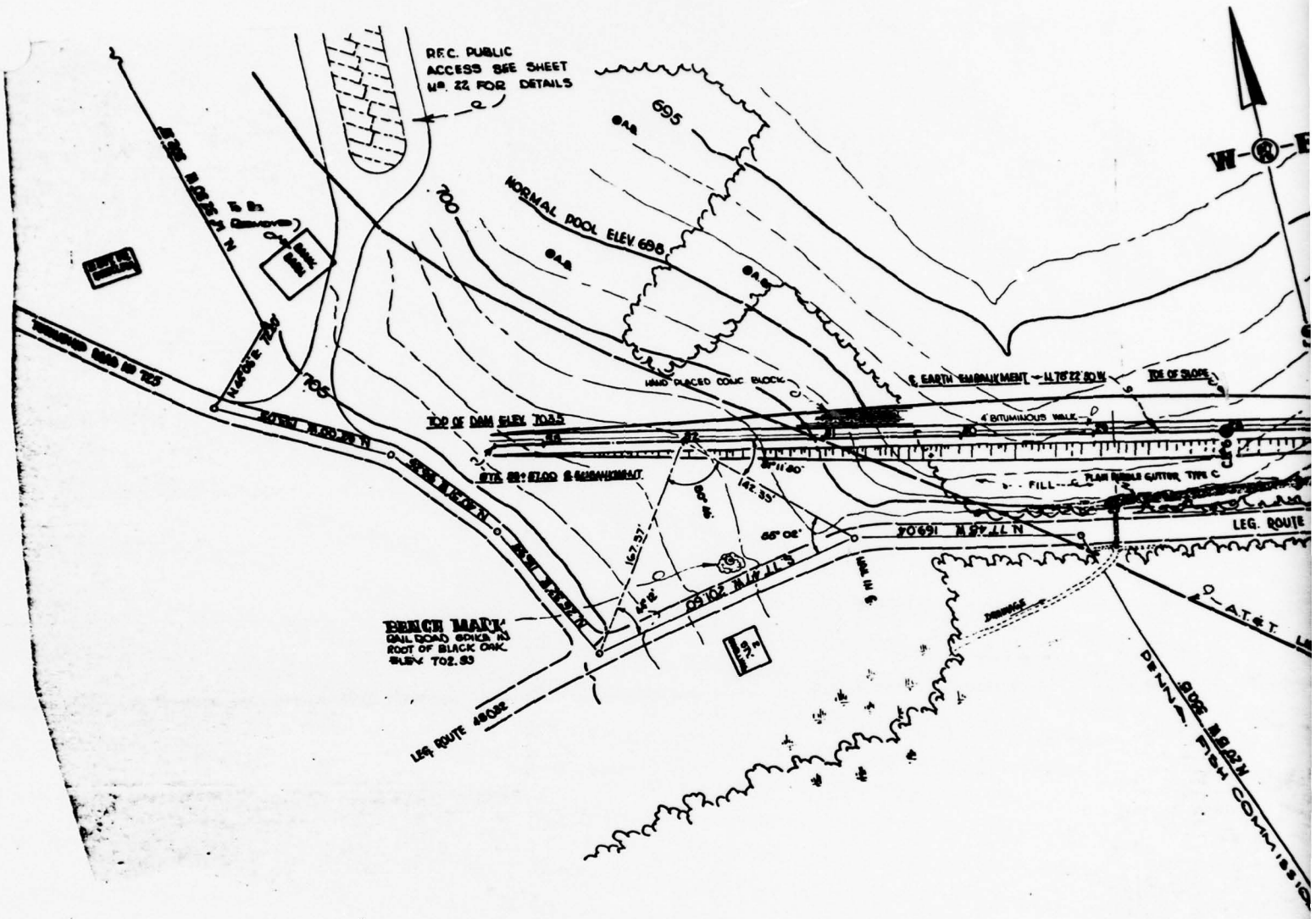
PLAN OF DAM AND APPURTENANT STRUCTURES

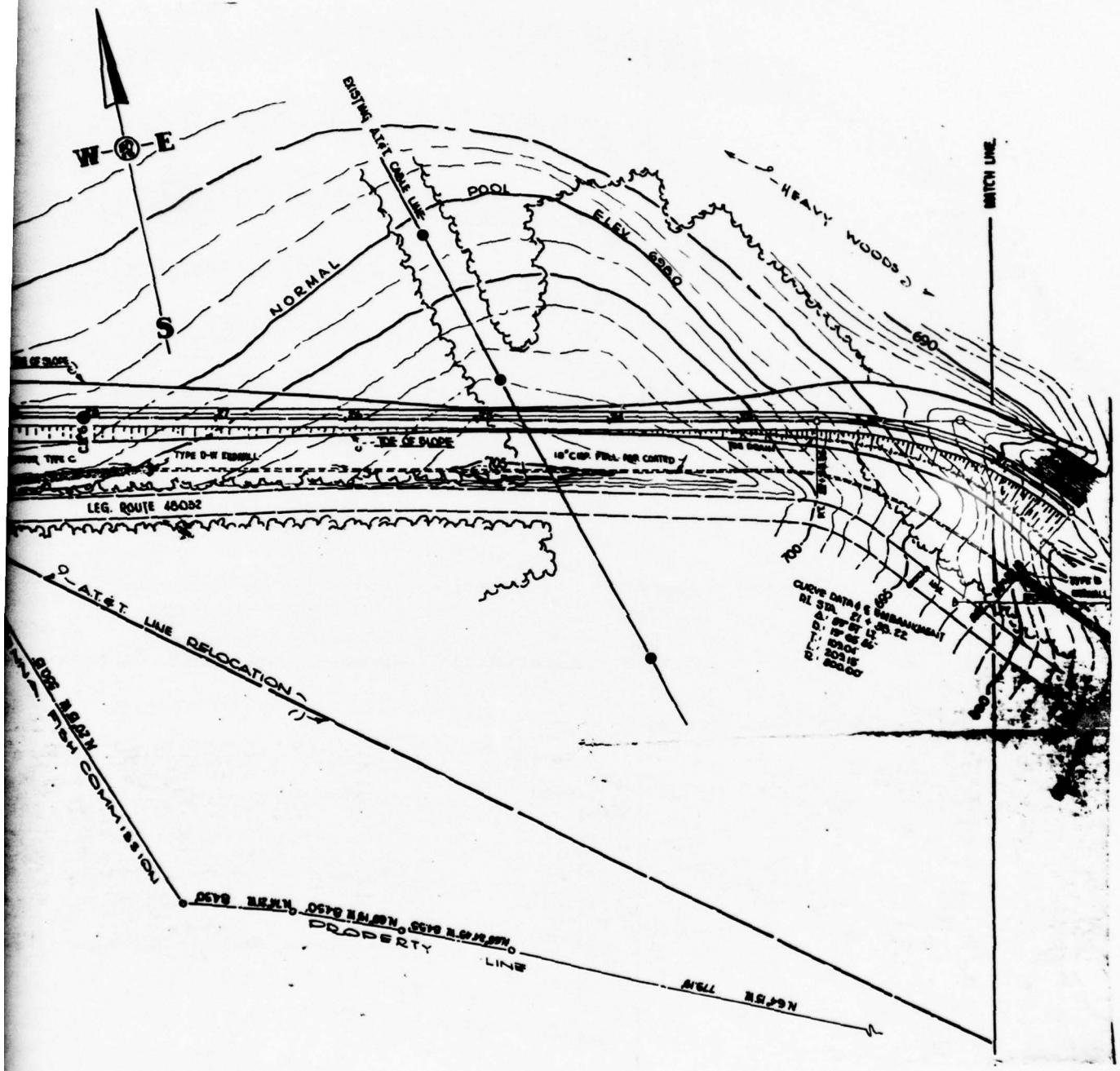
MINSI DAM

NAT.I.D.NO.PA.00788 | NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEET NO.2, DATED 4/10/68

PLATE 2


R.F.C. PUBLIC ACCESS SEE SHEET No. 22 FOR DETAILS
695
700
705
NORMAL POOL ELEV 698
HAND PLACED CONC BLOCK
E. EARTH EMBANKMENT
TOP OF DAM ELEV 708.5
4' BITUMINOUS WALK
FILL
PLAIN SHIELD GUTTER, TYPE C
LEG. ROUTE
BENCH MARK
RAIL ROAD SPIKE IN ROOT OF BLACK OAK
ELEV. 702.93
LEG. ROUTE 48032
DENNA FISH COMMISSION



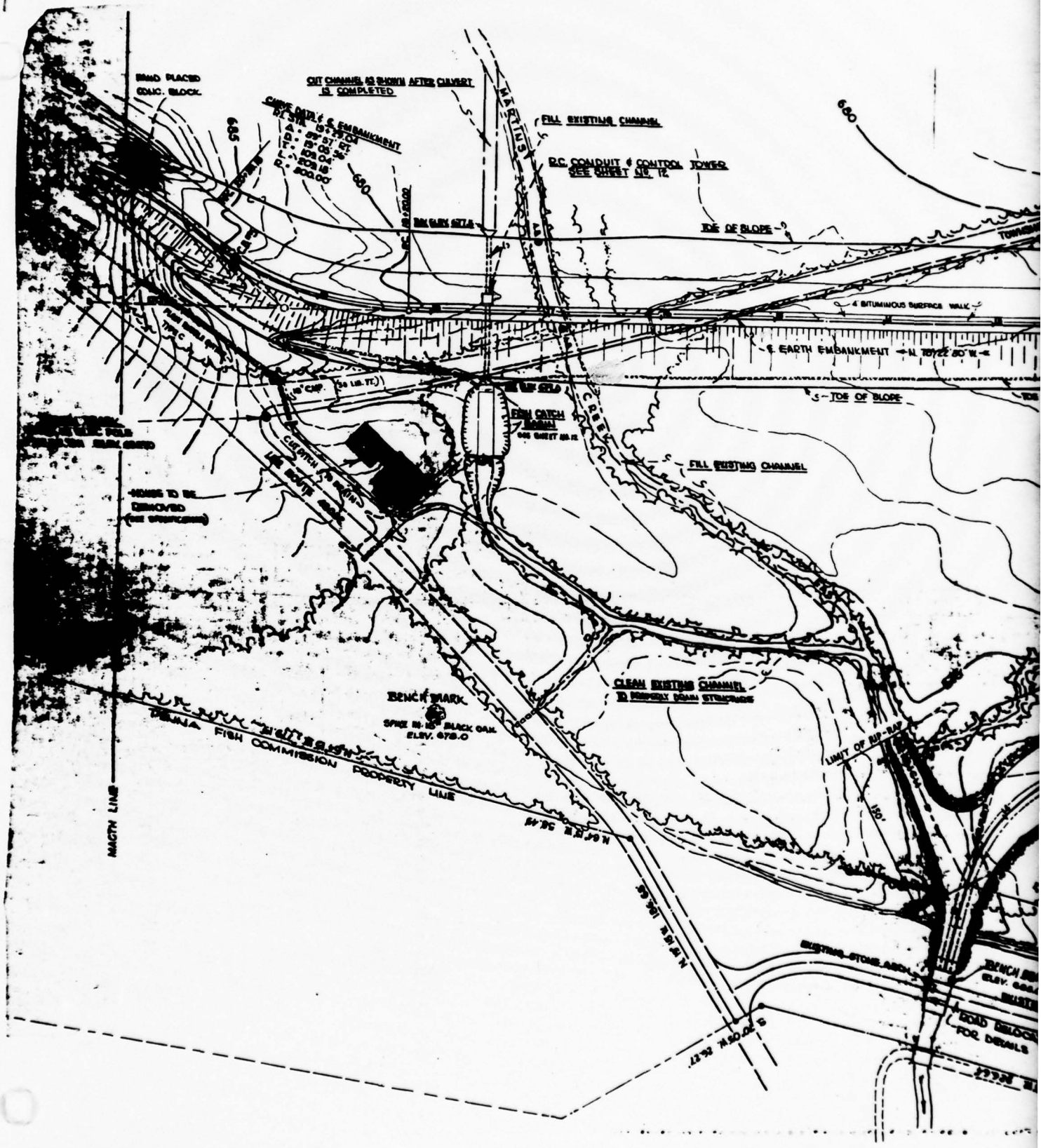
EMBANKMENT PLAN

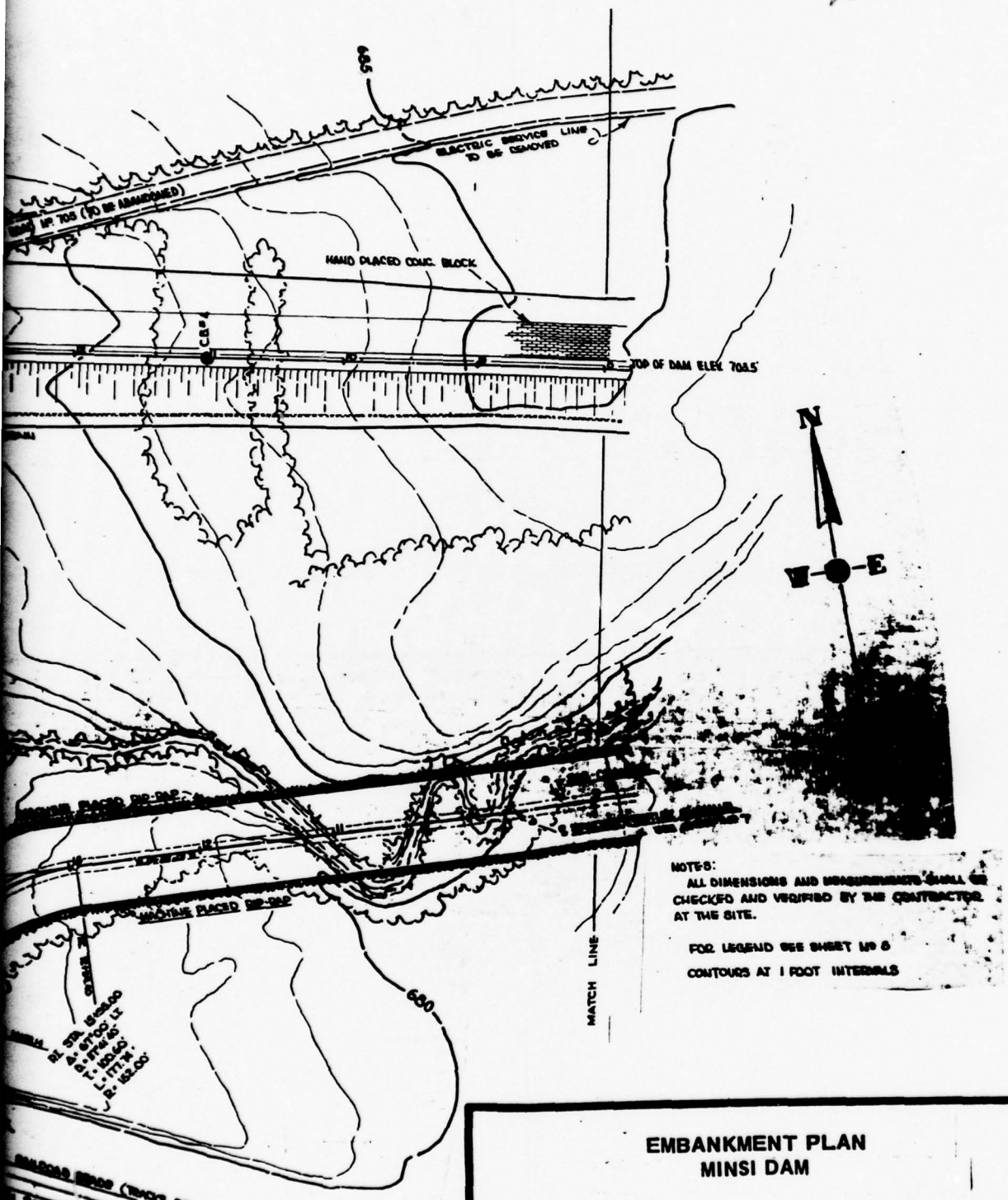
MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA FISH COMMISSION
PROJECT NO. F.C.-160-L; SHEET NO.3, DATED 4/10/68

PLATE 3A


BRUSH PLACED (TYP.)
CUT CHANNEL AS SHOWN AFTER CULVERT IS COMPLETED
CURVE DATA
FILL EXISTING CHANNEL
R.C. CONDUIT & CONTROL TOWER
TOE OF SLOPE
4 BITUMINOUS SURFACE WALK
℄ EARTH EMBANKMENT
FISH CATCH BASIN
FILL EXISTING CHANNEL
HOUSE TO BE REMOVED
CLEAN EXISTING CHANNEL & PROPERLY DRAIN STRUCTURE
BENCH MARK
SPIKE IN 18" BLACK OAK
ELEV. 678.0
PENNA. FISH COMMISSION PROPERTY LINE
LIMIT OF RIP-RAP
EXISTING STONE ARCH
ROAD RELOCATION
FOR DETAILS
MARTINS CREEK

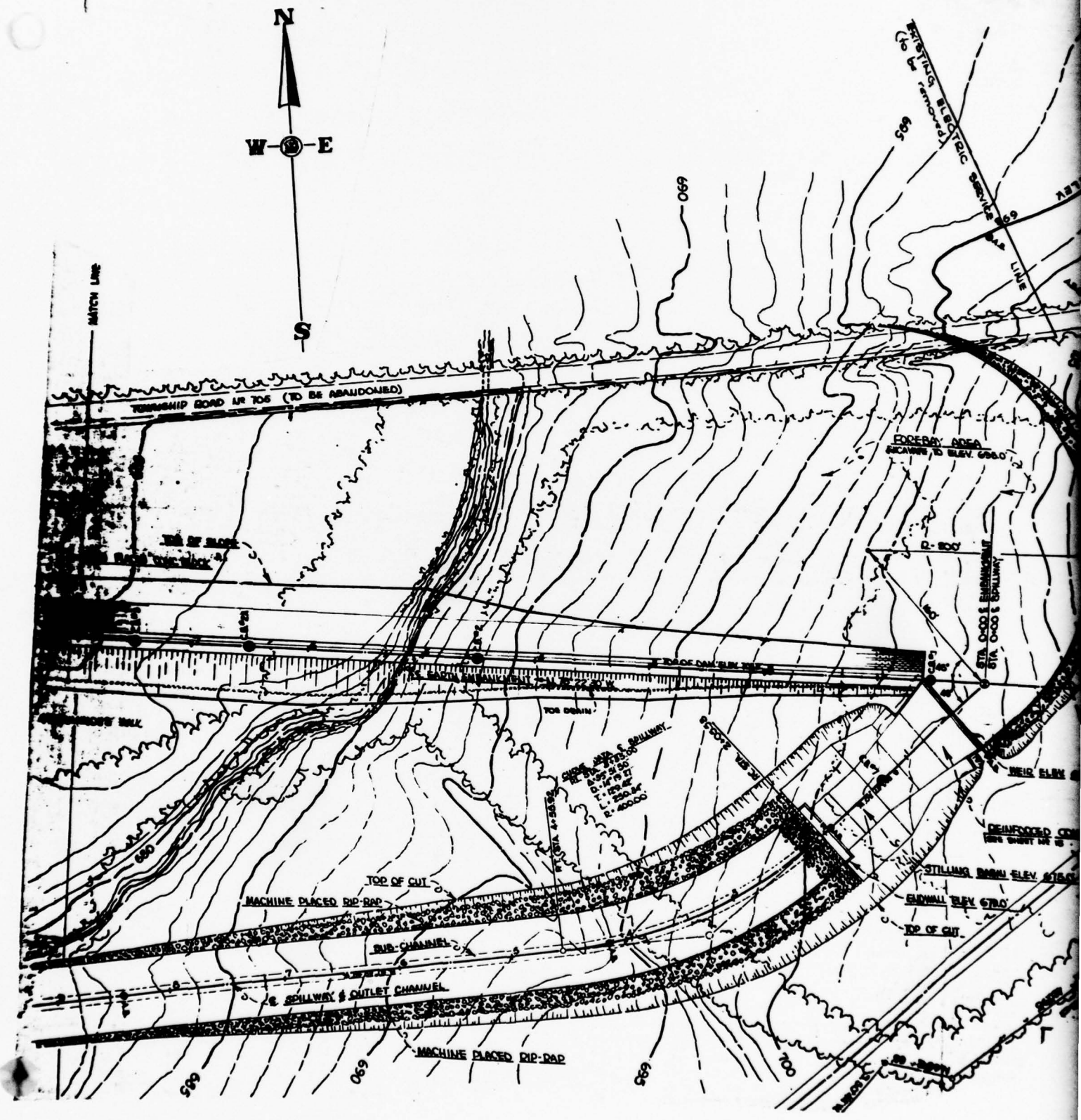


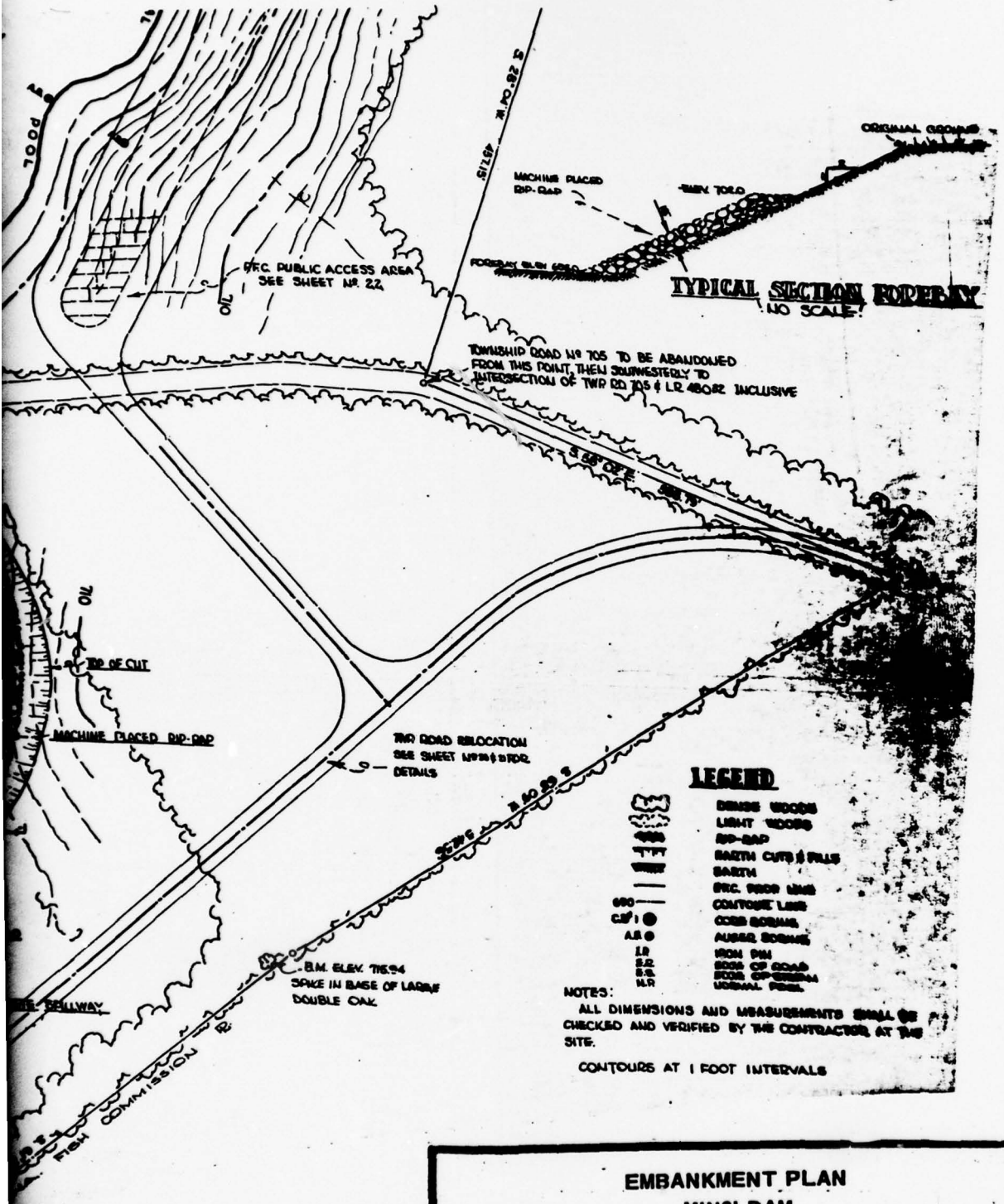
EMBANKMENT PLAN
MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEET NO.4, DATED 4/15/68

PLATE 3B


N
W
E
S
MATCH LINE
TOWNSHIP ROAD I.R. 706 (TO BE ABANDONED)
EXISTING ELECTRIC SERVICE (To be removed)
FOREBAY AREA
EXCAVATE TO ELEV. 668.0
TOP OF SLOPE
TOP OF DAM ELEV. 685
TOP DRAIN
TOP OF CUT
MACHINE PLACED RIP-RAP
SUB-CHANNEL
℄ SPILLWAY & OUTLET CHANNEL
MACHINE PLACED RIP-RAP
STILLING BASIN ELEV. 670.0
SIDEWALL ELEV. 676.0
TOP OF CUT
R=200'
669
685
700

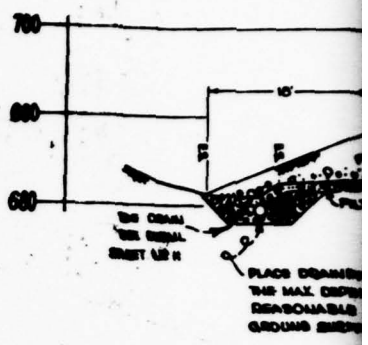


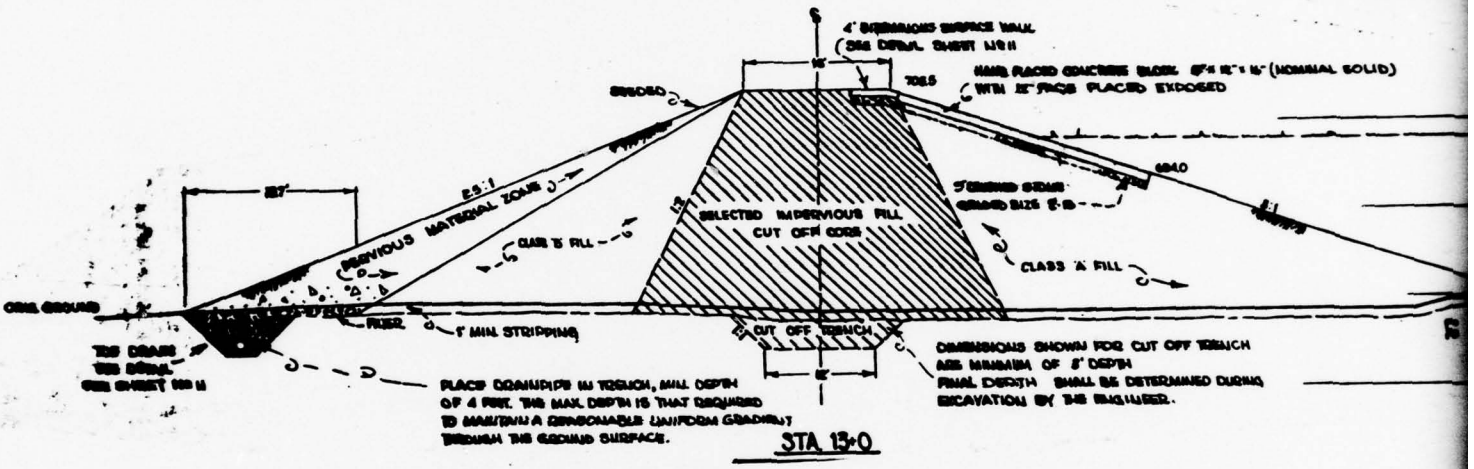
EMBANKMENT PLAN
MINSI DAM

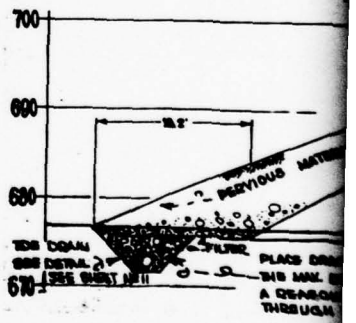
NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

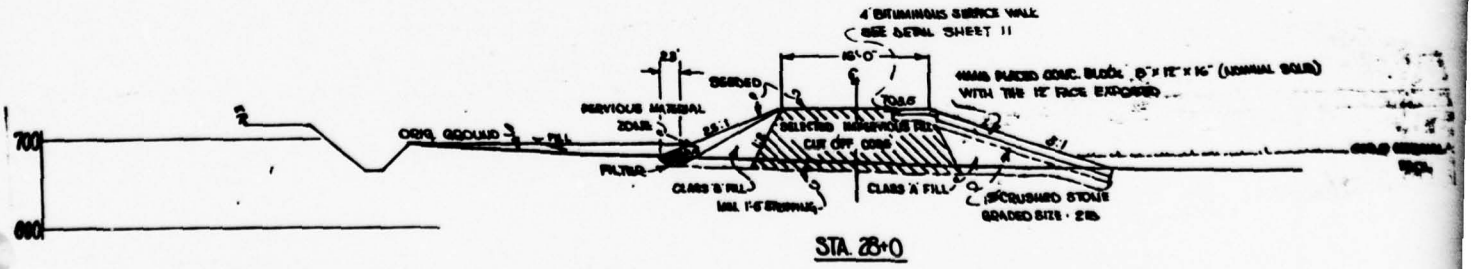
DATA OBTAINED FROM PENNA FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEET NO.5, DATED 4/15/68

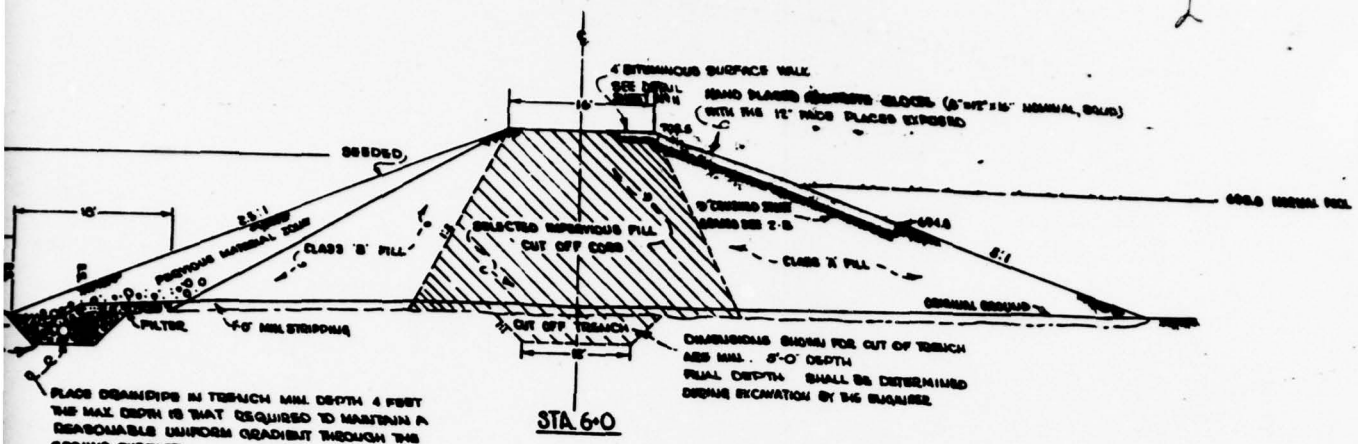
PLATE 3C

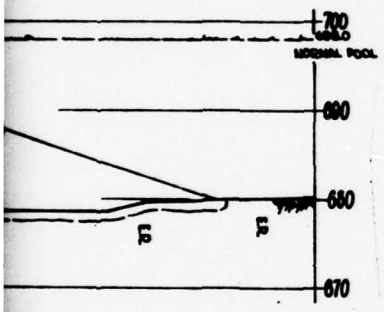

700
690
680
15'

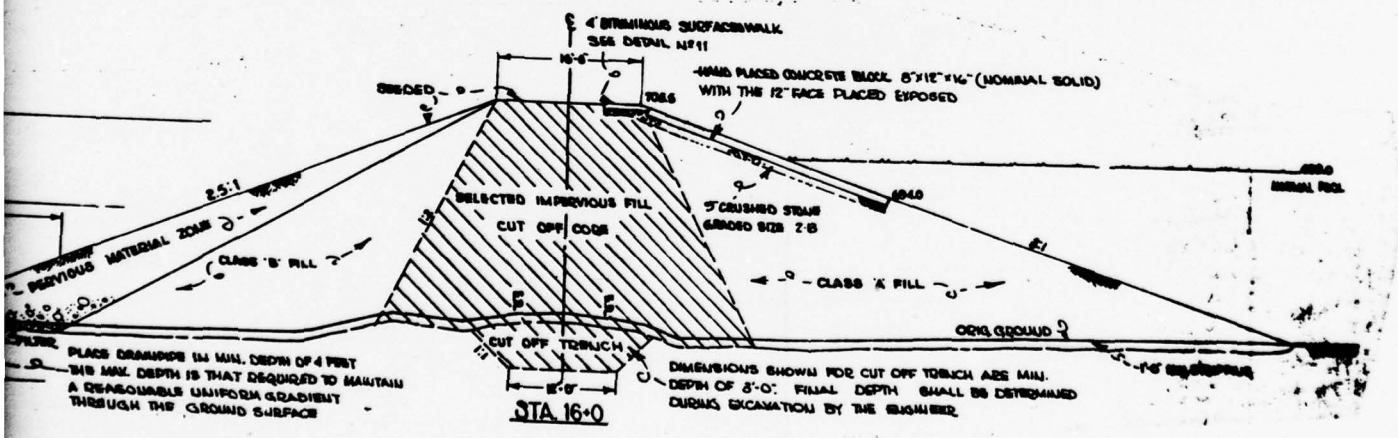

4' BITUMINOUS SURFACE WALK
(SEE DETAIL SHEET NO 11)
15'
HAND PLACED CONCRETE BLOCK 8"x 12" x 16" (NOMINAL SOLID)
WITH 12" FACE PLACED EXPOSED
SEEDED
708.5
PERVIOUS MATERIAL ZONE
2.5:1
CLASS 'B' FILL
SELECTED IMPERVIOUS FILL
CUT OFF CORE
1.5:1
6840
5" CRUSHED STONE
GRADED SIZE 2-B
CLASS 'A' FILL
ORIG. GROUND
FILTER
1' MIN. STRIPPING
CUT OFF TRENCH
TOE DRAIN
SEE DETAIL
SEE SHEET NO 11
PLACE DOWNSLOPE IN TRENCH, MIN. DEPTH
OF 4 FEET. THE MAX. DEPTH IS THAT REQUIRED
TO MAINTAIN A REASONABLE UNIFORM GRADIENT
THROUGH THE GROUND SURFACE.
DIMENSIONS SHOWN FOR CUT OFF TRENCH
ARE MINIMUM OF 5' DEPTH
FINAL DEPTH SHALL BE DETERMINED DURING
EXCAVATION BY THE ENGINEER.
STA. 13+0


700
690
680
670
15.5'
PERVIOUS MATERIAL
FILTER
TOE DRAIN
SEE DETAIL
SEE SHEET NO 11


4' BITUMINOUS SURFACE WALK
SEE DETAIL SHEET 11
15'-0"
HAND PLACED CONC. BLOCK 8" x 12" x 16" (NOMINAL SOLID)
WITH THE 12" FACE EXPOSED
SEEDED
PERVIOUS MATERIAL
ZONE
2.5:1
ORIG. GROUND
FILL
SELECTED IMPERVIOUS FILL
CUT OFF CORE
1.5:1
FILTER
CLASS 'B' FILL
MIN. 1'-6" STRIPPING
CLASS 'A' FILL
CRUSHED STONE
GRADED SIZE - 2B
700
690
STA. 28+0





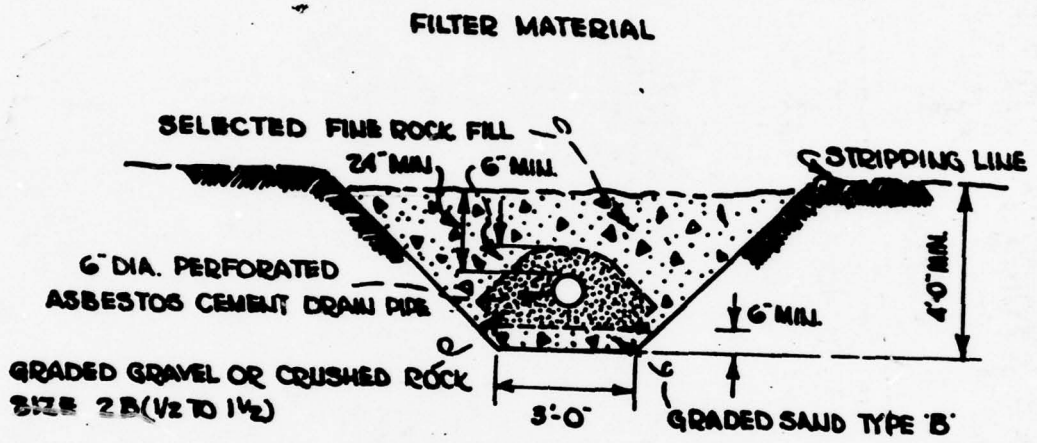


TYPICAL EMBANKMENT SECTIONS
MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

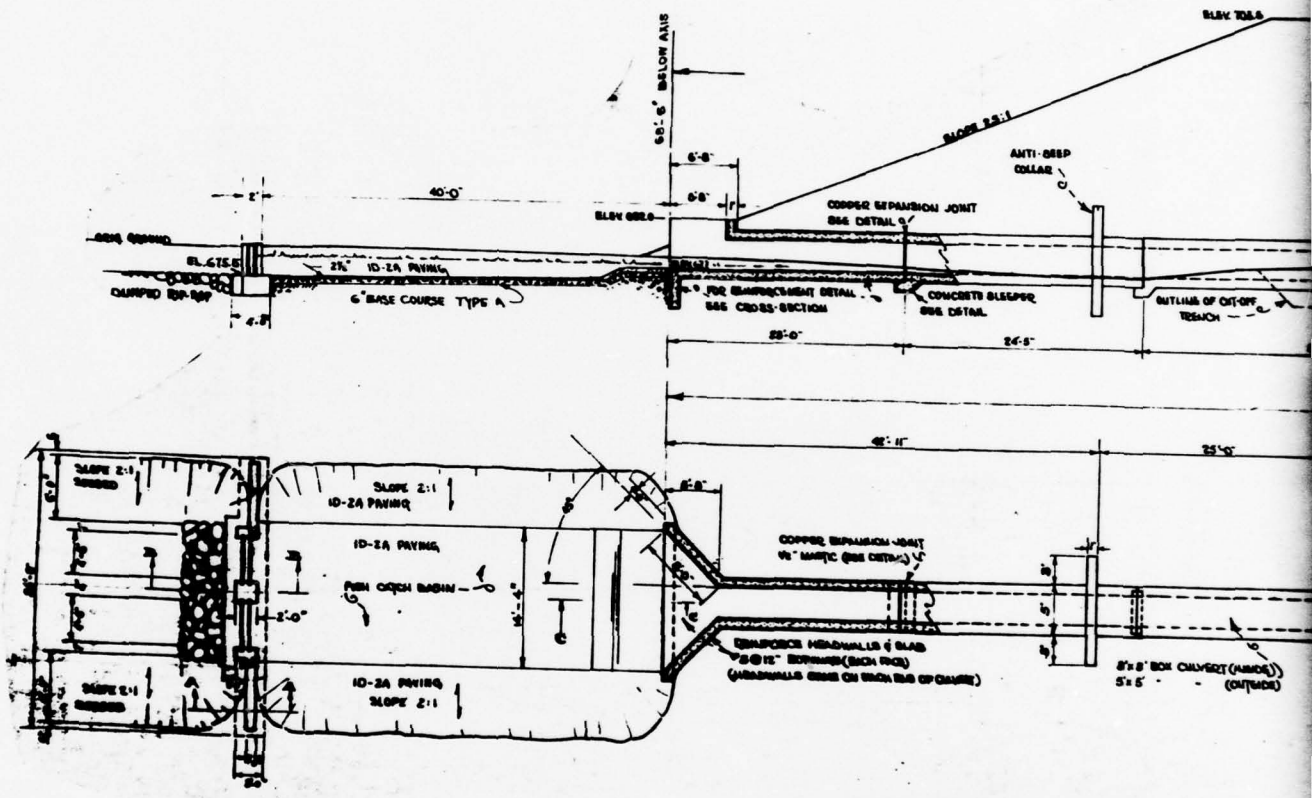
DATA OBTAINED FROM PENNA. FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEETS NO.8-11, DATED 1968

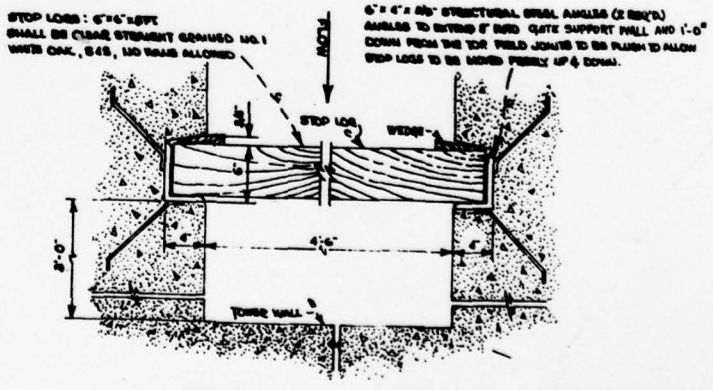
PLATE 4



DETAIL TOE DRAIN INSTALLATION

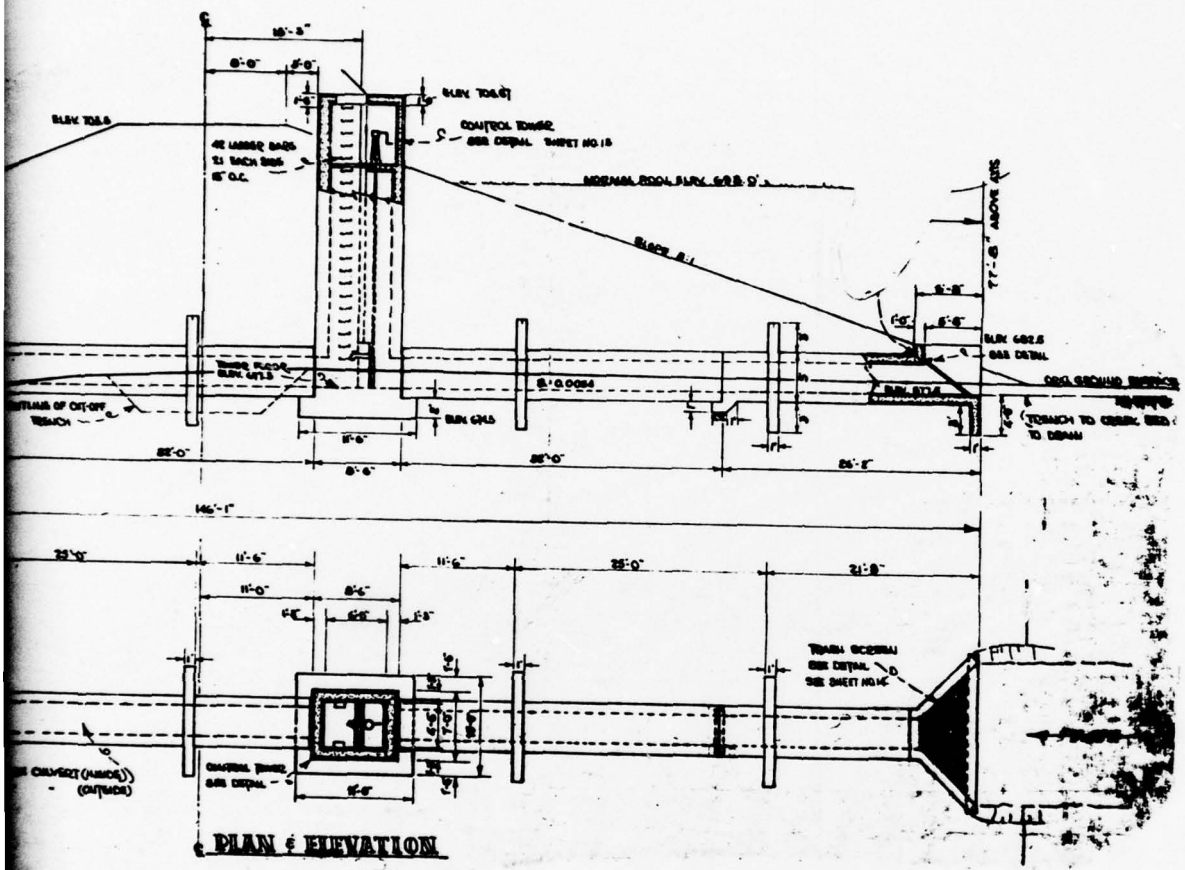
DETAIL TOE DRAIN INSTALLATION MINSI DAM	
NAT.I.D.NO.PA.00788	NORTHAMPTON COUNTY
DATA OBTAINED FROM PENNA. FISH COMMISION PROJECT NO. F.C.–160–L, SHEET NO.11, DATED 5/4/68	
	PLATE 5





STOP LOG GROOVE

2



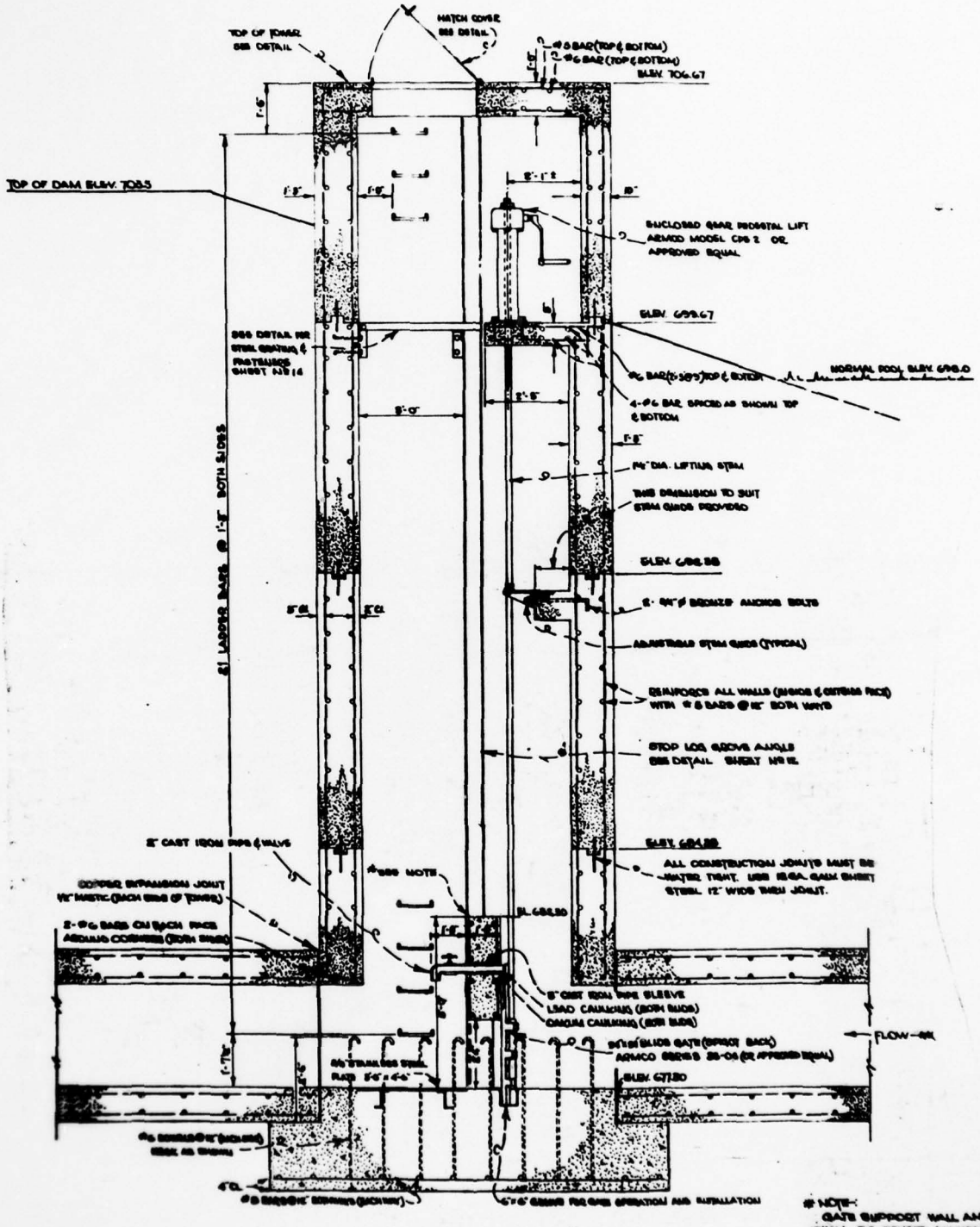
PLAN & ELEVATION

PLAN AND PROFILE OF OUTLET WORKS
MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

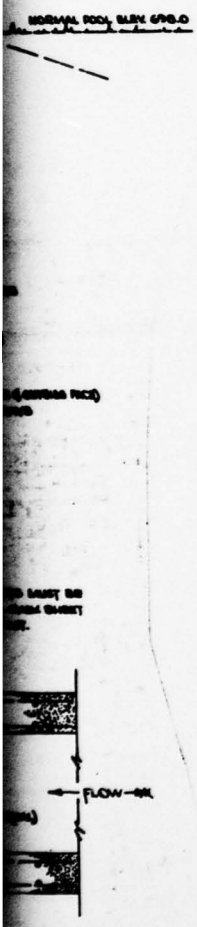
DATA OBTAINED FROM PENNA. FISH COMMISSION
PROJECT NO. F.C.-160-L, SHEET NO.12, DATED 4/10/68

PLATE 6



DETAILED SECTION of CONTROL TOWER

2

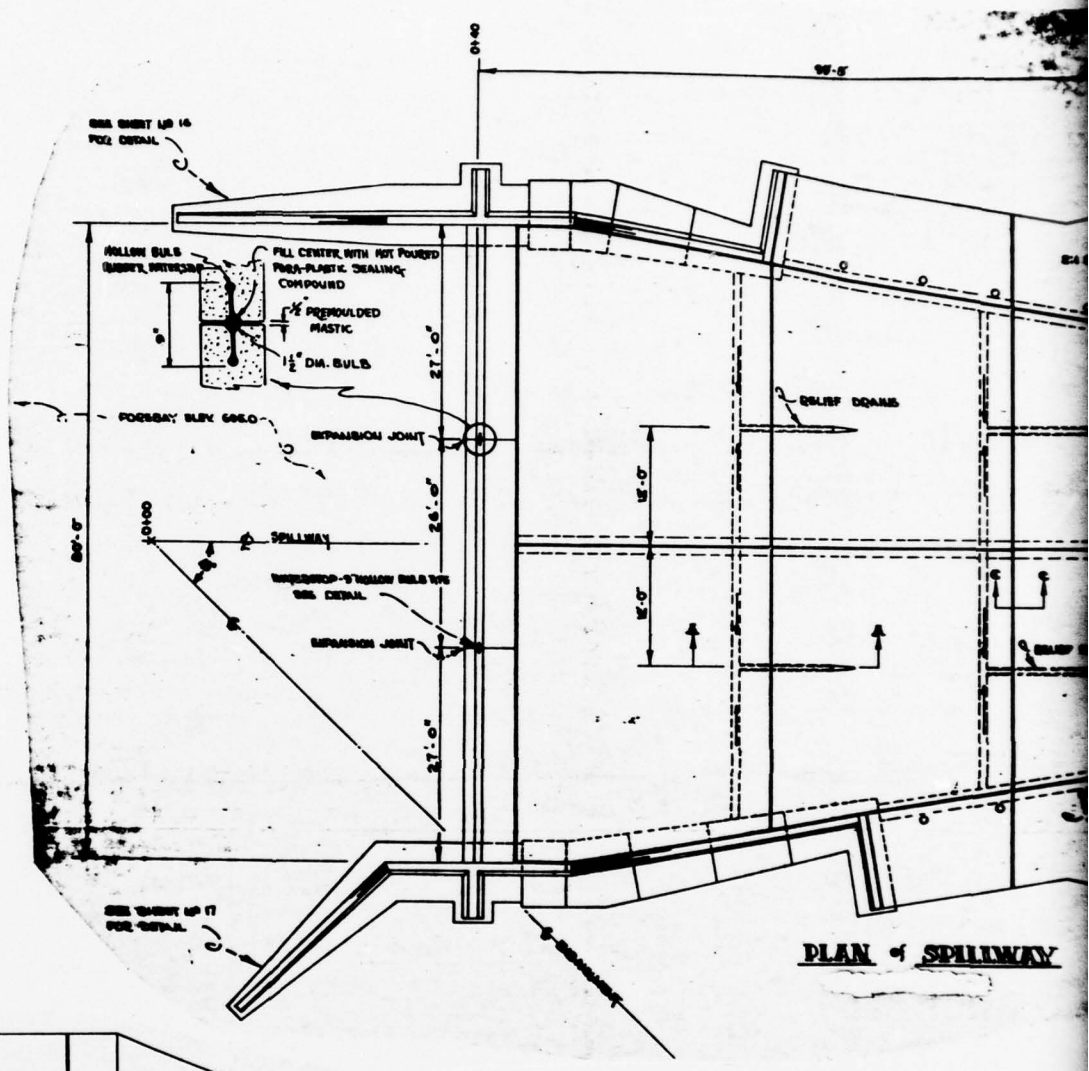


DETAILED SECTION OF CONTROL TOWER
MINSI DAM

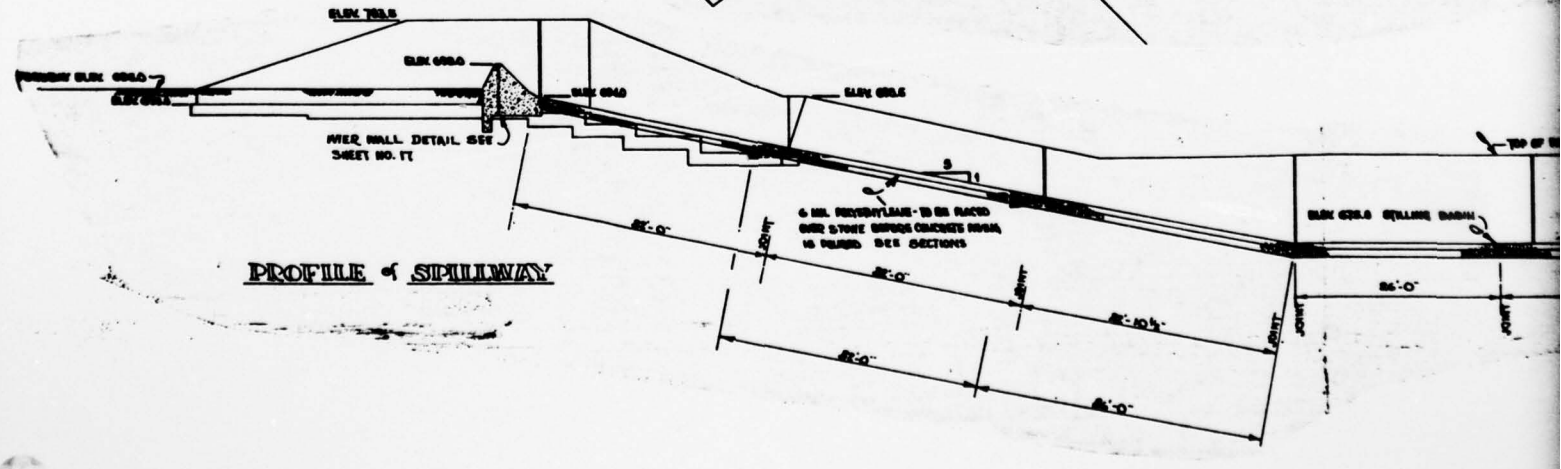
NAT.I.D.NO.PA.00788 | NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA. FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEET NO.13, DATED 4/19/68

PLATE 7

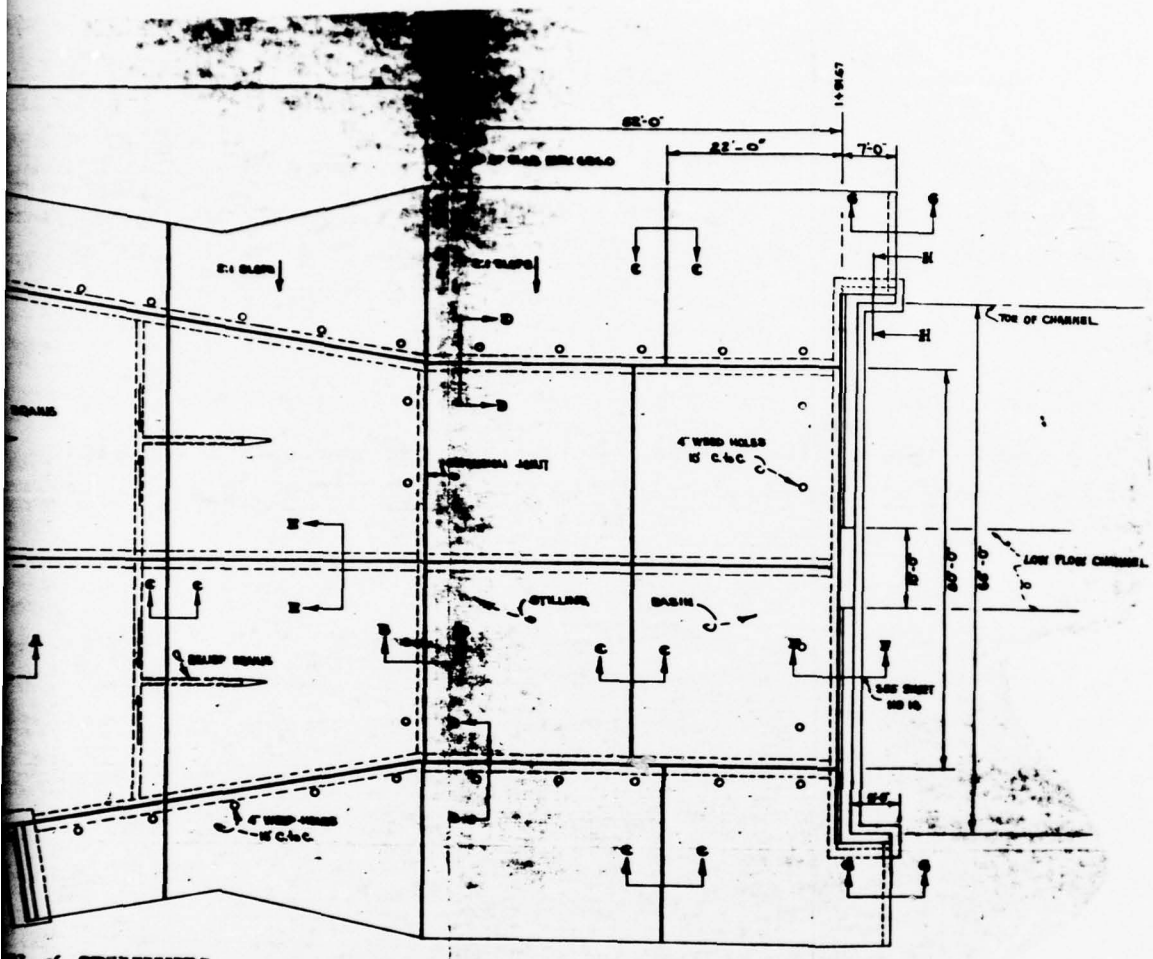


PLAN of SPILLWAY

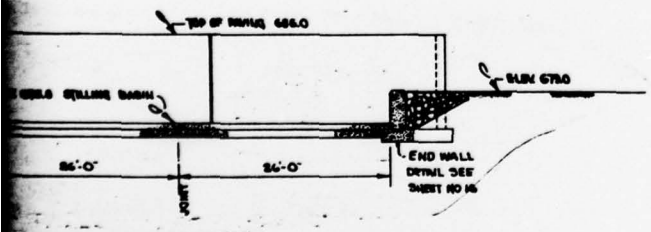


PROFILE of SPILLWAY

2



of SPILLWAY

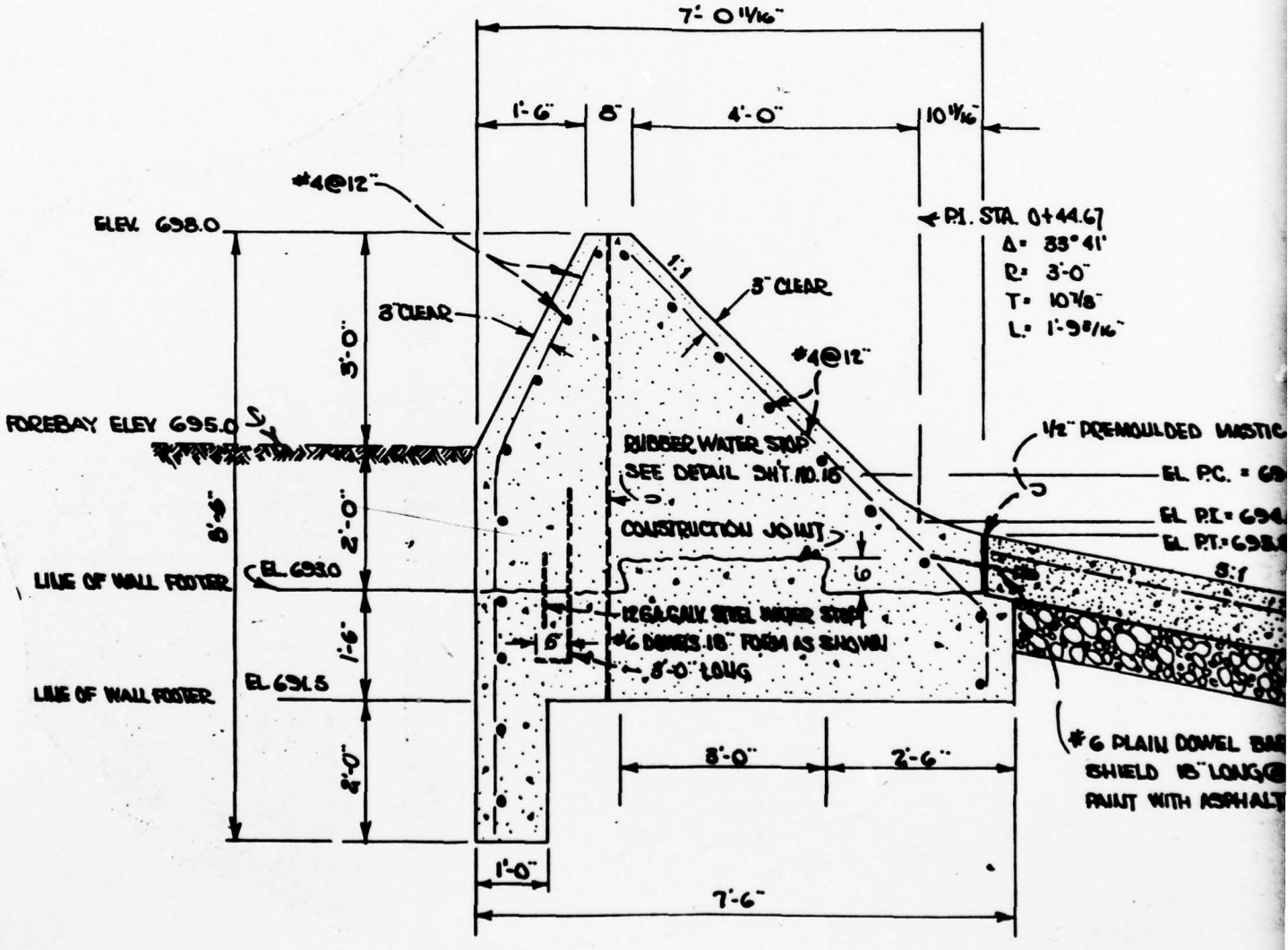


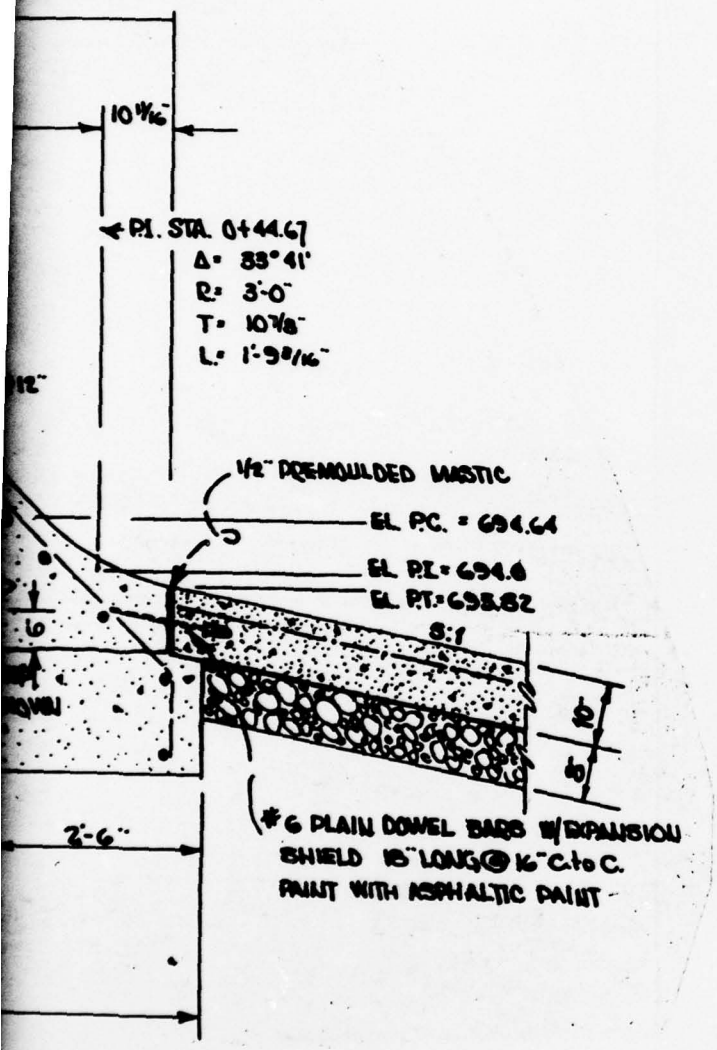
PLAN AND PROFILE OF EMERGENCY SPILLWAY
MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA. FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEET NO.15, DATED 4/10/68

PLATE 8


7'-0 11/16"
1'-6"
8"
4'-0"
10 11/16"
#4@12"
ELEV. 698.0
P.I. STA. 0+44.67
Δ = 33°41'
R = 3'-0"
T = 10 7/8"
L = 1'-9 8/16"
3" CLEAR
1:1
3" CLEAR
#4@12"
5'-0"
FOREBAY ELEV 695.0
1/2" PREMOULDED MASTIC
EL P.C. = 69
EL P.I. = 694
EL P.T. = 698.
RUBBER WATER STOP
SEE DETAIL SHT. NO. 15
CONSTRUCTION JOINT
10
8'-6"
2'-0"
LINE OF WALL FOOTER
EL 693.0
12 GA. GALV. STEEL WATER STOP
#6 DOWELS 18" FORM AS SHOWN
8'-0" LONG
5"
1'-6"
LINE OF WALL FOOTER
EL 691.5
8'-0"
8'-0"
2'-6"
#6 PLAIN DOWEL BAR
SHIELD 18" LONG @
PAINT WITH ASPHALT
1'-0"
7'-6"

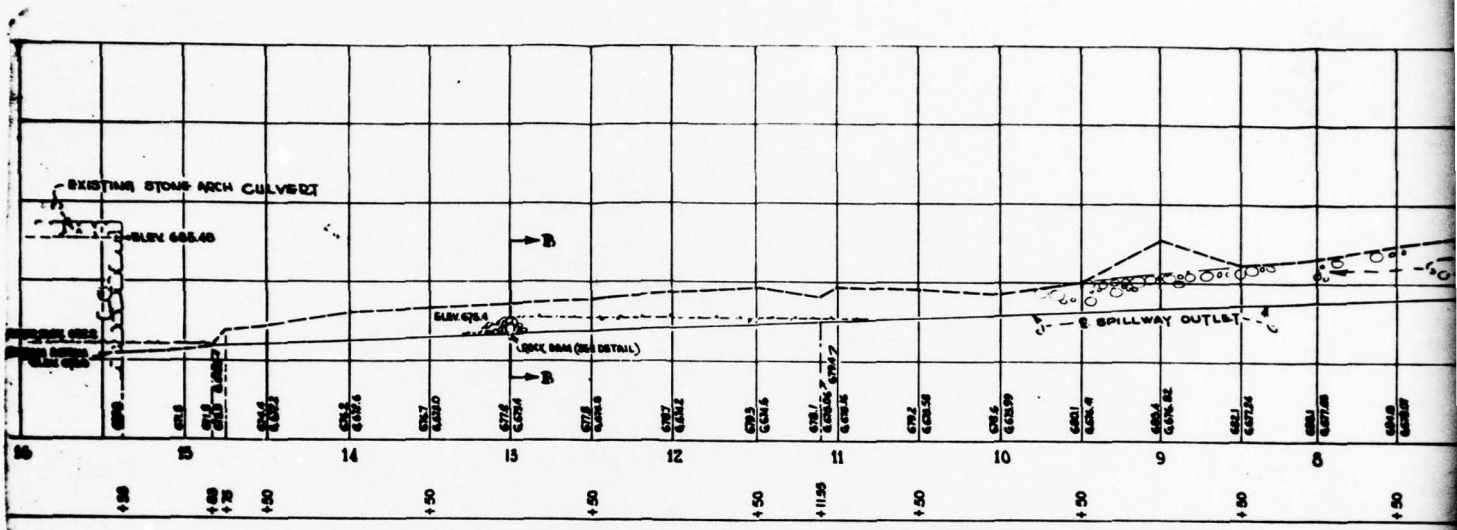


SPILLWAY CREST DETAILS
MINSI DAM

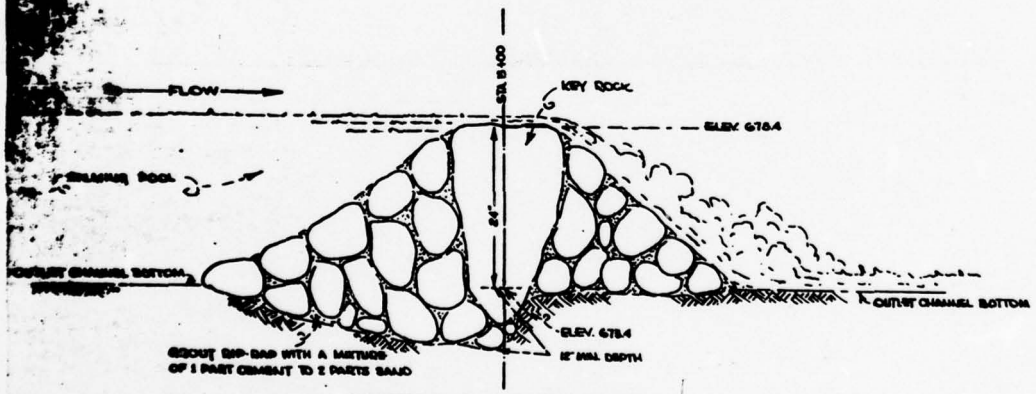
NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA. FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEET NO.17, DATED 4/10/68

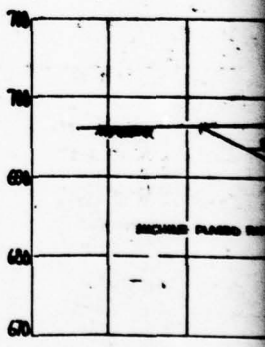
PLATE 9

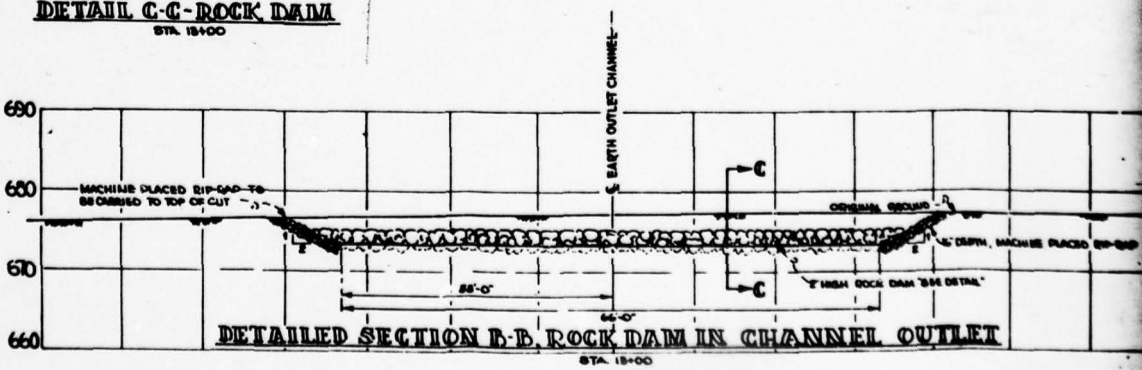


SPILLWAY & OUTLET CHAN

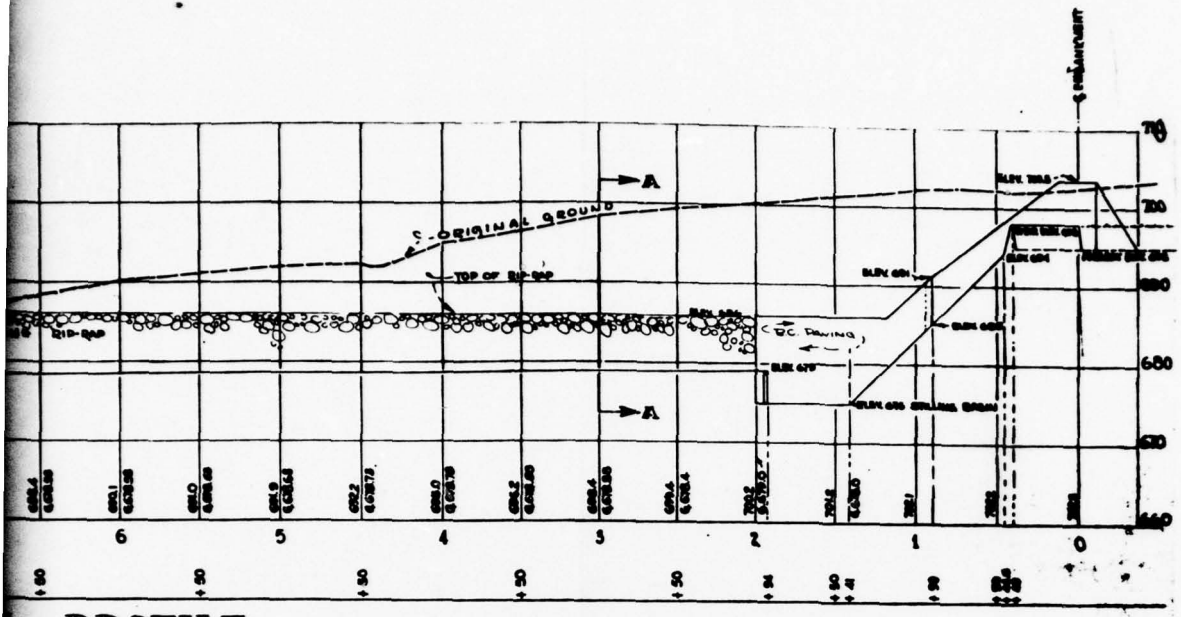


DETAIL C-C-ROCK DAM
STA. 13+00

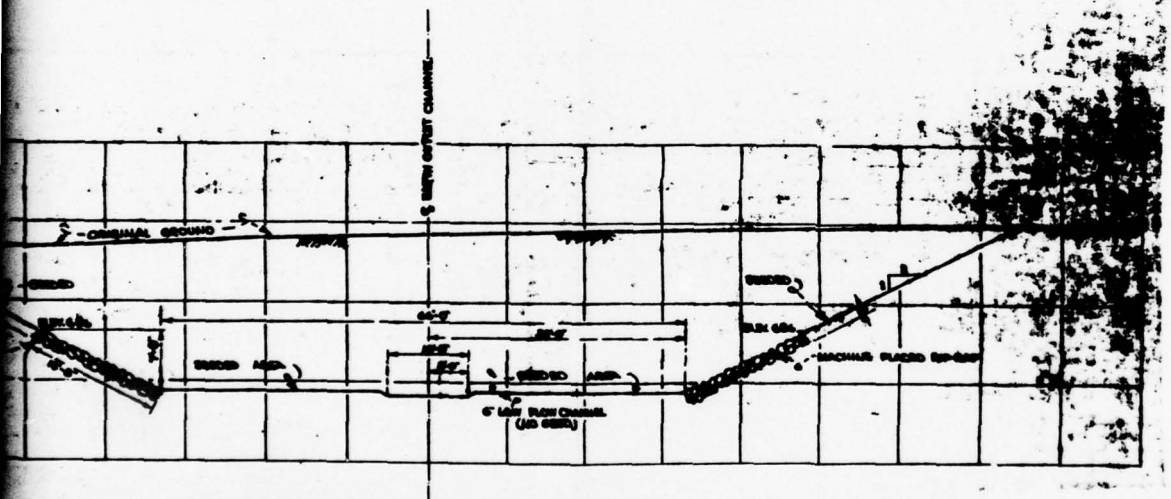




DETAILED SECTION B-B, ROCK DAM IN CHANNEL OUTLET
STA. 13+00



PROFILE



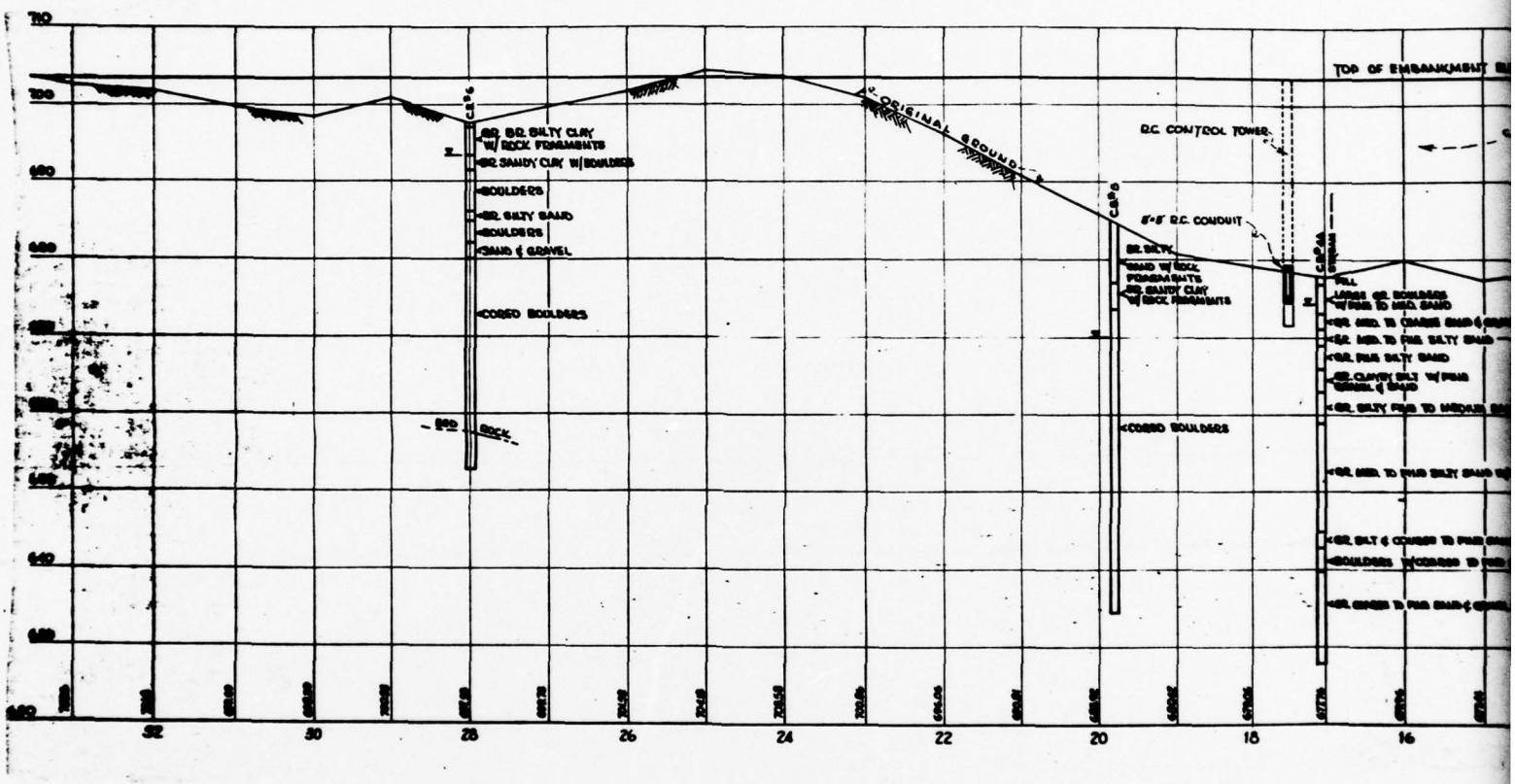
DETAILED SECTION A-A OUTLET CHANNEL

SPILLWAY AND OUTLET CHANNEL PROFILE AND DETAILS
MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA. FISH COMMISSION
PROJECT NO. F.C.–160–L, SHEET NO.7 DATED 4/10/68

PLATE 10



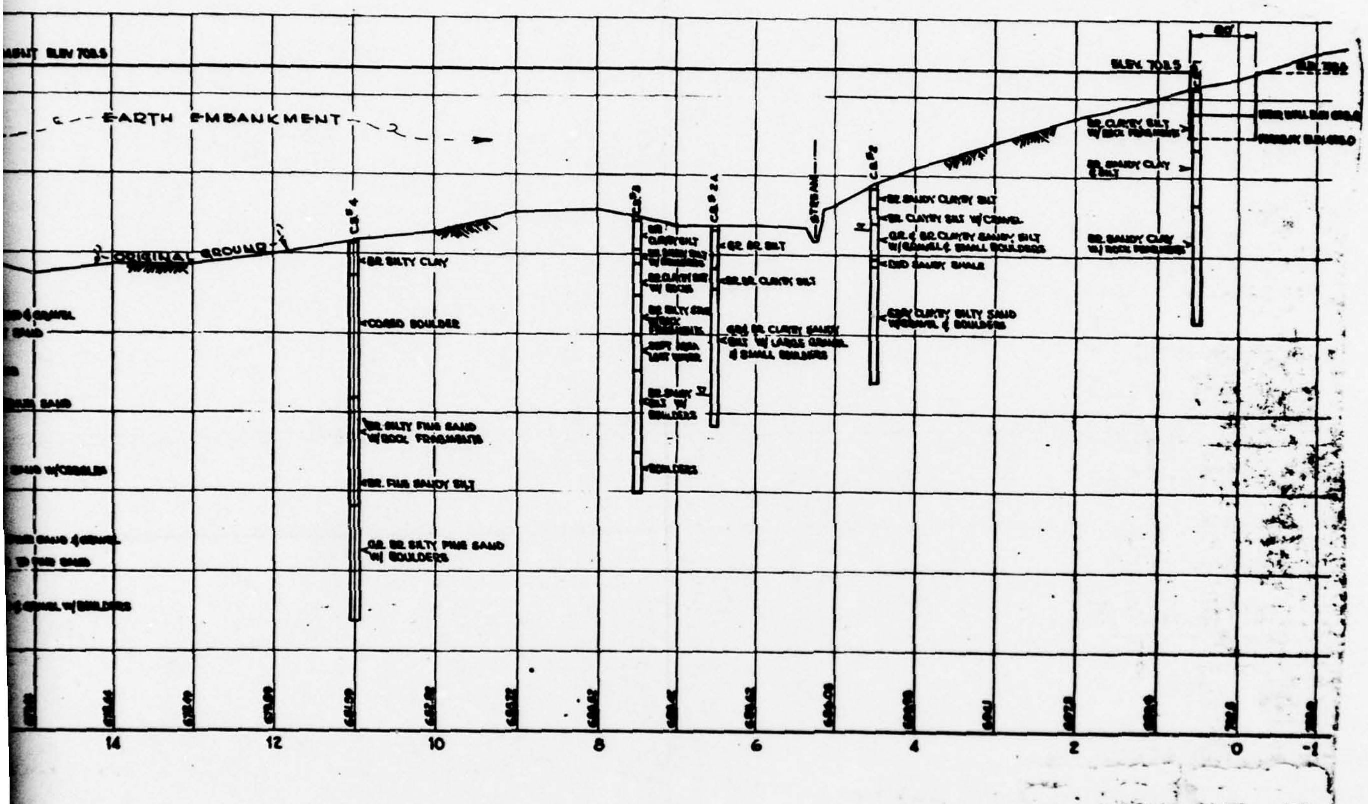
CORE BORING TABLE

HOLE NO.	STATION	OFFSET LT	OFFSET RT	GROUND ELEV.	APPROX. HOLE DEPTH
1	0 + 50		℄	701.3	50'
2	4 + 50		℄	688.9	50'
2A	6 + 50		℄	683.1	50'
3	7 + 50		℄	684.6	50'
4	11 + 50		℄	681.6	50'
4A	17 + 05		℄	678.0	50'
5	19 + 80		℄	684.1	50'
6	23 + 00		℄	697.5	50'

LEGEND

BR.	BROWN
GR.	GRAY
W/	WITH
MED.	MEDIUM
C.B.	CORE BORING
▽	GROUND WATER LEVEL
R.C.	REINFORCED CONCRETE
	EARTH

2



EMBANKMENT PROFILE AND CORE BORINGS
MINSI DAM

NAT.I.D.NO.PA.00788 NORTHAMPTON COUNTY

DATA OBTAINED FROM PENNA. FISH COMMISION
PROJECT NO. F.C–160–L, SHEET NO.6, DATED 4/10/68

PLATE 11

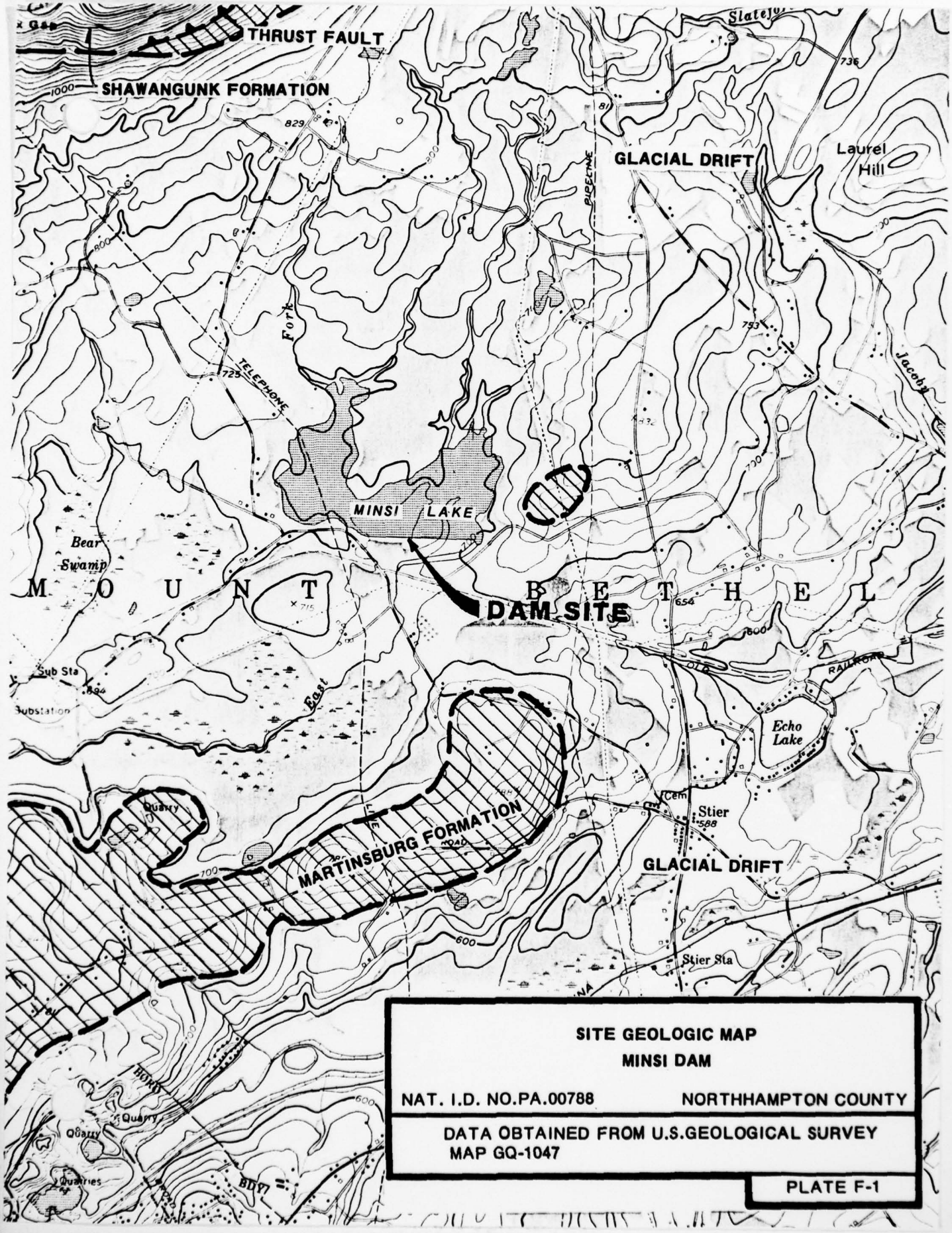
APPENDIX

F

SITE GEOLOGY
MINSI DAM

Minsi Dam is located in the Great Valley Section (adjacent to the Appalachian Mountain Section) of the Valley and Ridge Physiographic Province. As shown in Plate F-1, the bedrock underlying the dam site region is the Martinsburg Formation which consists predominantly of thick to thin bedded slates. Deposited over much of the bedrock, as is true for much of northeastern Pennsylvania, is a mantle of glacial drift. The regional bedrock structure is characterized by numerous northeast trending folds. A major regional northeast striking thrust fault (the Blue Mountain Decollement) is located approximately 1.75 miles north-northwest of the dam. Beneath the glacial cover, approximately 4,000 to 6,000 feet north-northwest of the dam, are two regional northeast trending folds with two similar folds located 3,000 to 4,000 feet to the southeast.

As indicated by data reviewed in the State files, the dam site area has a glacial cover consisting of 40 feet or more of silt and clay with interbedded lenses of silty sand and gravel and boulders overlying a quartzose slate (indicated as a shale sandstone in State files) bedrock. A northeastern strike and southeastern dip would most likely characterize the bedrock in the dam site area.



SITE GEOLOGIC MAP
MINSI DAM

NAT. I.D. NO.PA.00788 NORTHHAMPTON COUNTY

DATA OBTAINED FROM U.S.GEOLOGICAL SURVEY
MAP GQ-1047

PLATE F-1